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RECORD OF DECISION

BALDWIN PARK OPERABLE UNIT
SAN GABRIEL VALLEY SUPERFUND SITES
LOS ANGELES COUNTY, CALIFORNIA

United States Environmental Protection Agency
Region 9 - San Francisco, California

BALDWIN PARK RECORD OF DECISION
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PART I. DECLARATION

SITE NAME AND LOCATION

Baldwin Park Operable Unit
San Gabriel Valley Area 2 Superfund Site
Los Angeles County, California

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Baldwin Park Operable Unit (OU), San Gabriel Valley Superfund Sites, chosen in accordance with CERCLA as amended by SARA and, to the extent practicable, the National Contingency Plan. This decision is based on the administrative record for this operable unit.

In a letter from Margaret Felts, Deputy Director, Site Mitigation Program, Department of Toxic Substances Control, the State of California concurred with EPA's selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare or the environment.

DESCRIPTION OF THE REMEDY

The Baldwin Park Operable Unit addresses a large area of groundwater contamination in the San Gabriel Valley. Volatile organic compounds (VOCs) are present in the groundwater throughout a several mile long area, extending beneath the cities of Azusa, Irwindale, and Baldwin Park. Six other operable units address contamination in other portions of the San Gabriel Basin (see Figure ROD-4).

The remedy will limit further migration of contaminated groundwater to areas and depths that would benefit most from additional protection, remove a significant mass of contamination from the aquifer, and collect data necessary to determine final clean up standards for the Baldwin Park area. The Baldwin Park Operable Unit is classified as an interim action.

The selected remedy includes extraction of contaminated groundwater at the downgradient end of two broad subareas of contamination. The first of the two subareas is the *lower area*, where concentrations of trichloroethene (TCE), tetrachloroethene

(PCE), carbon tetrachloride (CTC), or other contaminants are five to 10 times Federal or State drinking water standards, and where downgradient portions of the aquifer are significantly less contaminated. The second area is the *upper area*, where concentrations of PCE or TCE exceed 200 times drinking water standards, indicating the presence of *non-aqueous phase contamination* or other surface or subsurface sources of TCE, PCE, CTC, or other contaminants that are acting as continuing sources of dissolved-phase groundwater contamination.

The remedy includes extraction of contaminated groundwater at locations and rates sufficient to *capture* contaminated groundwater moving from the upper and lower areas of contamination during all anticipated recharge conditions. EPA's analyses indicate that its remedial objectives will be efficiently met by extracting approximately 19,000 gallons per minute of contaminated groundwater as continuously as feasible. The final decision on precise extraction rates and locations will be made during remedial design. One or more existing groundwater extraction wells may be used in the remedy.

The remedy includes treatment facilities needed to remove TCE, PCE, CTC, and other contaminants from the extracted groundwater by either or both of two proven treatment technologies: *liquid-phase granular activated carbon* filtration and *air stripping* (with offgas controls). Treatment technologies will be determined during remedial design after additional groundwater quality data are obtained. One or more existing treatment facilities may be incorporated into the remedy.

The remedy includes pipelines, pump stations, and other conveyance facilities needed to deliver the treated groundwater to one or more uses or users. EPA's preference is that treated water be supplied to one or more water purveyors, possibly including Metropolitan Water District of Southern California, for distribution to their residential and business customers. The final decision will be made after completion of the ROD depending on the outcome of additional negotiations with potential recipients of the treated water to identify recipients that can be supplied at least cost with the fewest institutional obstacles.

If water purveyors can accept water for most, but not all, of the year, excess water may be piped to spreading basins and flood control channels operated by the Los Angeles County Department of Public Works for recharge into the aquifer. If agreements cannot be reached with water purveyors, water may be recharged year-round. If necessary, recharge location(s) will be determined during remedial design.

The remedy includes the installation and sampling of groundwater monitoring wells, the sampling of existing monitoring wells, measurement of groundwater elevations at monitoring and production wells, and the measurement of other aquifer properties to verify or refine plume boundaries, predict treatment facility influent concentrations, and evaluate the effectiveness of the remedy.

EPA will review this action every five years throughout the interim remedy period.

EPA is the lead agency for this project and the Department of Toxic Substances Control of the State of California Environmental Protection Agency is the support agency.

DECLARATION

This interim action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements directly associated with this action and is cost effective. This action utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable for this interim action. The statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element will be addressed at the time of the final response action. Subsequent actions are planned to fully address the principal threats at the site.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, EPA shall conduct a review, pursuant to CERCLA Section 121, 42 U.S.C. Section 9621, at least once every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Felicia Marcus — 3/31/94
Regional Administrator

PART II. DECISION SUMMARY

This Decision Summary summarizes site-specific information and analyses relevant to the selection of an interim remedy for the Baldwin Park Operable Unit of the San Gabriel Valley Area 2 Superfund Site. The Decision Summary includes a description of the nature and extent of contamination, a comparative analysis of *remedial alternatives* (i.e., clean up options), a description of the selected remedial alternative, and the rationale for the selected remedy. The Decision Summary presents some of the same information included in the Declaration (Part I), but in significantly greater detail.

1. SITE LOCATION AND DESCRIPTION

Section 1.1 briefly describes the location and physical characteristics of the San Gabriel Valley, including its topography, geology, hydrology, land use, and water management practices. Section 1.2 describes the Baldwin Park area in more detail.

1.1 The San Gabriel Valley: Location, Physical Characteristics, and Water Management Practices

1.1.1 Location and Topography

The San Gabriel Valley is a suburban, largely developed portion of Los Angeles County covering more than 170 square miles (see Figure ROD-1). More than one million residents live in the Valley, alongside a variety of commercial and industrial operations.

The San Gabriel Mountains are a major geologic feature of the region. They form the northern boundary of the San Gabriel Valley, rising up to 10,000 feet in elevation. The Valley surface is a broad piedmont plain, which slopes from the San Gabriel Mountains southward towards a gap in the southern hills known as the Whittier Narrows. The average slope of the valley floor is about 65 feet per mile. Figure ROD-2 shows major features of the area.

1.1.2 Surface Water, Groundwater, and Water Management

Major surface water features in the San Gabriel Valley include the San Gabriel River, tributaries to the San Gabriel River, and *spreading basins* located to the river channels. The San Gabriel River system drains a portion of the San Gabriel Mountains. Surface flow in much of the San Gabriel River is intermittent; the river channel is often dry, except during significant storm events and spring runoff.

Tributaries to the San Gabriel River present in the Baldwin Park area include Big Dalton Wash, Little Dalton Wash, and Walnut Creek. Much of the length of these tributaries has been lined with concrete. As in the San Gabriel River, flow in the tributaries is intermittent, limited to storm events or when the channels are being used to transport water to recharge facilities.

Los Angeles County operates two *spreading basins* in the Baldwin Park area to increase recharge of the aquifer. Groundwater producers in the San Gabriel Valley typically extract more water than is "naturally" replenished; the overdraft is replaced by "artificially" recharging water in the spreading basins. The recharged water originates as local storm runoff or is imported surface water transported from Northern California and the Colorado River. The two spreading basins are the large Santa Fe Spreading Grounds, located in the northern part of the Baldwin Park area along the San Gabriel River, and the smaller Irwindale Spreading Grounds (ISG), located in the eastern portion of the Baldwin Park area adjacent to Big Dalton Wash.

1.1.3 Water Rights and Water Management Institutions

The San Gabriel Basin aquifer underlies most of the San Gabriel Valley. It stores an estimated three trillion gallons of water and is the primary source of water for most of the Basin's one million residents. In the last 20 years, annual groundwater extraction (pumping) in the Basin has ranged from approximately 59 to 78 billion gallons per year. A typical household uses 150 to 250 gallons per day.

Water resource management in the San Gabriel Basin is governed by two court decisions resulting from intra- and inter-basin conflicts over the use of water.

The first lawsuit, settled in 1964 as the Long Beach Judgment, requires that the water users in the San Gabriel Basin deliver an average of 98,415 acre-feet/year of usable water to the downstream Central Basin. (One acre-foot equals 325,829 gallons.) The San Gabriel River Watermaster administers the interbasin agreement.

The second lawsuit, settled in 1973 as the Alhambra Judgment, allocates water rights within the San Gabriel Basin. The Main San Gabriel Basin Watermaster was established to administer the Alhambra Judgment. This Judgment includes a monetary *assessment* on those water purveyors pumping more than their annual share of the *Operating Safe Yield*, as set by the Watermaster. Assessment fees are used to buy imported water for basin replenishment.

Agencies which use or manage water in the Basin currently includes 3 watermasters, 3 municipal water districts, the Metropolitan Water District, the San Gabriel Basin Water Quality Authority, 45 water purveyors, and 105 individual water-rights holders. The role of the municipal districts is mainly to provide supplemental water supplies from Metropolitan Water District of Southern California (Metropolitan) or the State Water Project (SWP). The water purveyors vary in size and type and include investor-owned utilities, special districts, city water departments, and small mutual water companies.

Water purveyors in the Baldwin Park area include the: City of Azusa, California Domestic Water Company, City of Glendora, La Puente Valley County Water District, San Gabriel Valley Water Company (SGVWC), Suburban Water Systems (Suburban), Valley County Water District (VCWD), and others.

Purveyors in the basin have, for the most part, acted independently in deciding where, when, or in what quantities they pump groundwater. In 1991, due in large part to EPA and State efforts, the Watermaster adopted rules to regulate water supply actions that may affect the movement of contaminated groundwater in the San Gabriel Basin. There is not yet a consensus on the adequacy of Watermaster's efforts to regulate water supply actions in the Basin.

1.2 The Baldwin Park Area

The Baldwin Park Operable Unit (OU) addresses groundwater contamination in and near the cities of Azusa, Irwindale, and Baldwin Park, in the area EPA has designated as Remedial Investigation (RI) Area 5 (Figure ROD-2). The approximate location of this multiple square-mile area, referred to as the "OU area" or "Baldwin Park area," is west of Azusa Avenue (Highway 39), south of the San Gabriel Mountains, east of the San Gabriel River, and north of Walnut Creek.

Nearly all of the Baldwin Park area is fully developed for residential, commercial, and industrial use. The largest parcels of open land are active and inactive gravel pits and the Santa Fe Flood Control Basin.

The Sierra Madre Fault system passes through the northern portion of the Baldwin Park area, generally east/west, near the base of the San Gabriel Mountains. The system presents a low-permeability barrier that limits groundwater movement southward from the San Gabriel Mountains. In the OU area, groundwater levels north of the fault system are substantially higher than those to the south.

The surficial geology of the Baldwin Park area is composed of alluvial materials deposited by the San Gabriel River and its tributaries. Braided stream deposits occur along River channels; outcrops of stream channel deposits also occur along River channels and major tributaries. Floodplain deposits and undifferentiated alluvium cover the area between the stream channels. The underlying sediments are derived from the dominantly crystalline San Gabriel Mountains and are typically coarse-grained (e.g., sand, gravel, and boulders). These sediments are unconsolidated to partially consolidated non-marine sediments of Recent and Pleistocene Age. They were deposited by fluvial and geomorphic processes associated with the San Gabriel River and its tributaries. Marine sediments, probably of Pleistocene and Pliocene Age, underlie some of the non-marine sediments and are included within the groundwater system.

The northern and central portions of the Baldwin Park area consist almost entirely of massive gravel deposits. Lithologic evaluations of well logs indicate gravel deposits greater than 500 feet in thickness in the northern portions of the Baldwin Park area, mixed with 10- to 30-foot-thick layers of clay and gravelly clay further south. The thickness of alluvial sediments is believed to range from a few hundred feet in the north to over 2,000 feet in the south.

Hydraulic conductivity estimates in the Baldwin Park area are some of the highest in the basin. Aquifer test results from seven locations yield hydraulic conductivity estimates between about 270 and 5,000 ft/day. The highest estimates are for the northern and central portion of the basin; lower values are observed toward the southwestern and southeastern margins. These high hydraulic conductivity estimates indicate that very large extraction volumes are required to create significant changes in the flow of groundwater. Estimates of specific yield are 0.1 to 0.2, reflecting the coarse-grained materials in the area.

Figure ROD-3 reprints a map prepared by the Los Angeles County Department of Public Works (LACDPW) illustrating water levels during fall 1990. The figure shows water level contours drawn using data from 150 to 200 wells. (Groundwater flows in a direction perpendicular to groundwater level contours.) The figure provides a snapshot of regional flow, but does not show local-scale variations in groundwater flow caused by pumping, recharge, or geologic faults.

Figure ROD-3 indicates that groundwater flow in the OU area is generally towards the Whittier Narrows to the southwest. The direction of flow can vary significantly from Figure ROD-3 (by more than ninety degrees), however, particularly in the vicinity of the Santa Fe Spreading Grounds during periods of significant recharge.

An estimate of the average horizontal gradient in the Baldwin Park area in the fall 1990 is approximately 0.002 foot per foot (ft/ft), which is among the lowest in the basin (estimate derived from Figure ROD-3). Deviations from this regional estimate are expected to be greatest in the vicinity of pumping wells, recharge areas, and faults. Vertical gradients are not well known. At one location in the middle of the Baldwin Park area where data are available on vertical gradients across 1300' of the aquifer, gradients are low (< 0.004 ft/ft in September 1991). Vertical gradients may be locally higher, however, near pumping wells, geologic faults, and zones of recharge, such as spreading basins.

The elevation of the water table in the Baldwin Park area can vary significantly year to year, decreasing during dry years and rapidly increasing during periods of above-average rainfall. In the period 1982-1992, the groundwater level at the "Baldwin Park Key Well" (identified in the Alhambra Judgment) began 1982 at approximately 240', declined during subsequent drought years to just under 200' in 1991, then rebounded to over 250' after the two relatively wet years of 1991/92 and 1992/93. This variability in water levels influences the movement of contaminants and complicates the installation of shallow monitoring wells (e.g., requiring relatively long-screened intervals).

2. SITE HISTORY: Origins, Discovery, and Local Response to the Groundwater Contamination

2.1 Origins and Discovery of the Contamination

Volatile Organic Compounds (VOCs), the contaminants responsible for placement of portions of the San Gabriel Basin on the National Priorities List (NPL), were apparently used in large quantities at industrial facilities as early as the 1940s. Throughout the 1940s, 50s, 60s, 70s, and 80s, carbon tetrachloride (CTC), tetrachloroethene (PCE), trichloroethene (TCE) and other VOCs were used by hundreds of businesses in the OU area for degreasing, as raw materials for automotive products, by a solvent recycler, for chemical extractions, and for other purposes. VOCs have probably been released to the ground by a combination of intentional disposal, careless handling during loading and unloading, leaking tanks and piping, and other means.

The significant depth to water in most of the OU area (100 to 400' below ground surface) provides some sorptive capacity for VOCs released to the soil. More importantly, however, the absence of extensive fine-grained layers (e.g., clay or silt layers) in the OU area increases the likelihood that contaminants released to the subsurface will reach groundwater. Fine-grained materials inhibit the downward movement of contaminants due to their lower permeability and higher sorptive capacity.

VOCs may have reached the groundwater as early as the 1940s or 1950s, but were not detected in groundwater until 1979 during environmental monitoring activities conducted by Aerojet Electrosystems near its facility in Azusa. In May 1984, four areas of contamination were listed as San Gabriel Valley Areas 1-4 on EPA's National Priorities List based on water quality information available at the time of listing. Subsequent investigation by EPA and others revealed widespread VOC contamination. During the past 12 years, more than two-thirds of the 366 *water supply wells* (also known as *production wells*) for which VOC data are available have shown detectable concentrations of VOCs; about one-quarter of the 366 wells have shown concentrations exceeding drinking water standards.

2.2 Remedial Investigation

EPA's Remedial Investigation of the San Gabriel Basin began in 1985 with a basinwide groundwater sampling program known as the Supplemental Sampling Program. In subsequent years, EPA completed additional field sampling efforts, which have included sampling of inactive water supply wells, depth-specific sampling of water supply wells, and monitoring well installation and sampling. The results of EPA's sampling efforts are summarized in numerous EPA documents:

> *Draft Technical Memorandum, Well Logging and Depth-Specific Sampling, San Gabriel Area 5 Remedial Investigation...* May 22, 1990.
>
> *Technical Memorandum, Sampling of Existing Wells, San Gabriel Area 5 Remedial Investigation.* June 25, 1991.
>
> *Technical Memorandum, Well Logging and Depth-Specific Sampling, San Gabriel Area 5 Remedial Investigation.* December 2, 1991.

Interim Report of Remedial Investigations, San Gabriel Basin... July 1992. (This report summarizes sampling activities up through 1989.)

Technical Memorandum, Sampling of Existing Wells--Second Round, San Gabriel Area 5 Remedial Investigation. July 1992.

Technical Memorandum, Area 5 Monitoring Well Installation and Sampling, San Gabriel Area 5 Remedial Investigation... October 26, 1992.

EPA's Remedial Investigation has included the compilation and analysis of data collected by individual water purveyors, business and property owners, and the Main San Gabriel Basin Watermaster. Individual water purveyors regularly sample more than 50 water supply wells in the Baldwin Park area in accordance with Federal and State drinking water requirements. Individual businesses and property owners have installed and sampled more than 25 groundwater monitoring wells in *facility-specific* investigations in the Baldwin Park area, most of which are overseen by the California Regional Water Quality Control Board (Regional Board). EPA works cooperatively with the Regional Board to set investigation priorities and provide assistance at individual sites as needed. The Main San Gabriel Basin Watermaster has also sampled several inactive water supply wells in the Baldwin Park area.

EPA has summarized and analyzed the results of the Remedial Investigation, making use of data collected by EPA and others, in the *Baldwin Park Operable Unit Feasibility Study Report*, dated April 2, 1993.

2.3 Local Response to the Contamination

EPA has not implemented any remedial actions in the Baldwin Park area, but water purveyors and local agencies have implemented or plan to implement projects that contribute or will contribute to EPA's remedial objectives.

As the contaminated groundwater has spread and existing water supply wells have become contaminated, water purveyors have installed treatment facilities and responded in a variety of other ways to satisfy their obligations to supply water meeting State and Federal drinking water standards. Some purveyors have shut down wells. In other cases they have been able to continue to operate contaminated wells by pumping wells intermittently, at reduced rates, or by blending contaminated water with better quality water from other wells. In other cases, they have drilled wells deeper or installed new wells in search of cleaner water, acquired water from other San Gabriel Basin water purveyors, or purchased imported water. More recently, as other options become less feasible and more costly, purveyors have installed wellhead treatment systems.

In the OU area, purveyors have made use of all of these options to respond to the contamination. The Valley County Water District (VCWD) has shut down four wells and installed wellhead treatment facilities at three others; the San Gabriel Valley Water Company (SGVWC) has shut down wells, deepened existing wells, drilled new deep wells, used blending, and installed wellhead treatment; Suburban Water Systems has blended and installed new deeper wells; and the City of Glendora has purchased additional imported water. Although more than 12 existing water supply wells have become contaminated in the area, the Baldwin Park area continues to serve as a significant source of drinking water. Periodic monitoring ensures that drinking water supplied to consumers meets EPA and State drinking water standards.

Three water purveyors (VCWD, SGVWC, and La Puente Valley County Water District) have funded treatment projects in the Baldwin Park area. The State Water Resources Control Board and the California Department of Toxic Substances Control have contributed funding for two other treatment facilities. State funding has been provided to the San Gabriel Basin Water Quality Authority, which has overseen the construction of a second Valley County Water District treatment facility (at the Arrow Highway well) and, as of March 1994, is preparing to begin construction of another treatment project at the Big Dalton well. If constructed and operated as planned, the project at the Big Dalton well site may partially satisfy EPA's remedial objectives in the Baldwin Park area. The Authority's planned project would result in the extraction and treatment of 2,000 to 3,000 gallons per minute (gpm) of contaminated groundwater, a small but significant portion of the approximately 19,000 gpm of extraction that EPA's studies indicate may be needed.

Water purveyors' response to the contamination has been driven by their need to supply safe drinking water to their customers. Initially, some purveyor actions (e.g., relocating wells from contaminated to clean areas) may have marginally contributed to the spread of contamination in the aquifer, but more recent actions (e.g., the installation of treatment) contribute to the cleanup. Still, EPA does not believe that actions by water purveyors provide an adequate, cumulative response to the contamination. The limitations of installing treatment only at existing water supply wells after the contamination has spread (occasionally termed *wellhead treatment*) are described further in Section 7 of this document (*Summary of Site Risks*).

3. ENFORCEMENT ACTIVITIES

EPA began its enforcement efforts in the Baldwin Park area in approximately 1985 with searches for and evaluations of historical Federal, State, and local records on chemical usage, handling, and disposal.

In 1985, the California Regional Water Quality Control Board (Regional Board) began its Well Investigation Program (WIP) to identify the sources of groundwater contamination detected in water supply wells. In 1989, EPA entered into a cooperative agreement with the Regional Board to expand the WIP program, in order to assist EPA in determining the nature and extent of the sources of the groundwater contamination in the Baldwin Park area and other portions of the San Gabriel Valley, and to identify responsible parties. The cooperative agreement has been renewed annually. Regional Board staff directly oversee *facility-specific* investigations in the Baldwin Park area; EPA's role has been to help fund the Regional Board, help set priorities, and, as needed, to intervene in individual investigations to obtain information, evaluate claims of inability to pay, and threaten or use Federal enforcement authority to ensure that necessary investigation work is promptly completed.

As of October 1993, the Regional Board has, in the Baldwin Park area, sent chemical use questionnaires to more than 1,600 facilities; inspected more than 600 of these facilities; directed more than 70 facilities to investigate potential soil or soil gas contamination; and directed approximately 17 facilities to investigate groundwater contamination. EPA has used its authority to request information (CERCLA section 104(e)) to supplement the Regional Board's efforts by sending information requests and evaluating responses from more than 150 current and historical property owners and businesses.

Concurrent with source identification efforts, EPA carried out a *fund-lead* Remedial Investigation and Feasibility Study (RI/FS) (i.e., using funding from the Superfund trust fund), rather than through enforcement action. In the RI/FS, EPA supplemented data generated during *facility-specific* investigations with *regional* information on the nature and extent of contamination.

A subset of the 70+ facilities investigating contamination in the Baldwin Park area are believed to be contributors to the groundwater contamination. EPA has sent General Notice of

Liability for the Baldwin Park Operable Unit to approximately 110 owners and/or operators, representing 20 to 25 contaminated parcels. Most of the General Notice letters were sent in three mailings: in May 1990, September 1990, and August 1993.

EPA anticipates issuing special notice for the Baldwin Park Operable Unit in 1994 to a subset of recipients of General Notice. EPA has begun discussions with individual Potentially Responsible Parties (PRPs) and the San Gabriel Basin Industry Coalition (representing multiple PRPs) in an effort to speed the start of clean up work in the Baldwin Park area. To date, however, no Administrative Orders on Consent or Consent Decrees have been attempted or reached, and no Unilateral Administrative Orders (UAOs) have been issued, to or with PRPs in the Baldwin Park area. One Baldwin Park area PRP, the Aerojet Gencorp, agreed in 1990 to pay $554,678.59 associated with investigating Aerojet's Azusa, California facility in partial settlement of EPA past costs.

Enforcement efforts in other parts of the San Gabriel Valley Superfund Sites include a Consent Order reached in September 1993 with 42 PRPs for the Puente Valley Operable Unit (see Figure ROD-4). In addition, as of March 1994, four parties in the Puente Valley and El Monte Operable Units of the San Gabriel Valley have been issued UAOs for Remedial Investigation. Work required by one of the UAOs is complete; work required by two of the UAOs is in progress; and work required by the fourth UAO is expected to begin soon.

4. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan for the Baldwin Park Operable Unit, in the form of a fact sheet, was distributed in May 1993 to more than 2,000 parties on EPA's mailing list for the San Gabriel Valley Superfund Sites. Additional copies of the Proposed Plan were distributed to water purveyors and to Baldwin Park area businesses known to have subsurface contamination. The Proposed Plan, together with the Baldwin Park Operable Unit Feasibility Study, were also made available in the San Gabriel Valley at the West Covina Public Library, the office of the Upper San Gabriel Valley Municipal Water District in El Monte, and the office of the San Gabriel Valley Municipal Water District in Azusa, California. The entire Administrative Record File, containing these two documents and other documents considered or relied upon in developing the Proposed Plan, is available at the West Covina Public Library and at EPA's Regional Office in San Francisco.

Notice of a public meeting, availability of the Proposed Plan and Feasibility Study, and the announcement of a 30 day public comment period were published in the San Gabriel Valley Tribune newspaper on May 7, 1993. EPA also issued a press release announcing the Proposed Plan on May 7, 1993. In addition, the Los Angeles Times and San Gabriel Valley Tribune newspapers published articles about the remedial investigation, feasibility study, and Proposed Plan.

A public meeting was held on May 20, 1993 in the Baldwin Park City Council Chambers to discuss EPA's clean up plans. At this meeting, EPA representatives made a brief presentation of the Proposed Plan, answered questions, and solicited comments from members of the public. A response to comments received during the public meeting is included in the Baldwin Park OU Responsiveness Summary, which is included as Part III of this Record of Decision (ROD).

EPA extended the public comment period twice in response to requests for extensions from members of the public. A public notice printed in the San Gabriel Valley Tribune on June 12, 1993 extended the original 30 day public comment period to 60 days. Another notice printed in the San Gabriel Valley Tribune on July 15, 1993 extended the public comment period to 91 days. The public comment period closed on August 12, 1993. EPA received more than 400 written comments from 26 individuals or entities, as well as a three hour videotape. These comments and EPA's responses to these comments are summarized in Part III of this ROD.

Other community relations activities have included extensive consultation with local water purveyors, State and local agencies, and local groups and individuals potentially affected by EPA's planned action in the Baldwin Park area, including participation at numerous public meetings attended by representatives of more than a dozen state and local agencies and members of the public. These public meetings have typically been held bimonthly or quarterly, from 1990 through late 1993. EPA representatives have also made presentations to interested groups, including the San Gabriel Basin Water Quality Authority Public Advisory Group and the Superfund Working Information Group (SWIG). In addition to the Baldwin Park Proposed Plan fact sheet, EPA has issued fourteen fact sheets between 1986 and 1993 describing investigation and clean up activities throughout the San Gabriel Valley.

This decision document presents the selected remedial action for the Baldwin Park Operable Unit in Los Angeles County, California, chosen in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. The decision for this site is based on the Administrative Record.

5. SCOPE AND ROLE OF THE OPERABLE UNIT

There are four areas of groundwater contamination in the San Gabriel Basin listed on the National Priorities List (NPL). They are San Gabriel Valley Area 1, San Gabriel Valley Area 2, San Gabriel Valley Area 3, and San Gabriel Valley Area 4.

The Baldwin Park Operable Unit is one of seven operable units initiated by EPA to date (see Figure ROD-4). The OU addresses groundwater contamination extending across the cities of Azusa, Irwindale, and Baldwin Park, corresponding to the San Gabriel Valley Area 2 NPL site. Other OUs address groundwater contamination in one or more of the other three NPL areas of the Basin.

The available data indicate the presence of groundwater contamination in the Baldwin Park area far in excess of drinking water standards (demonstrating a need for action) and are sufficient to determine the approximate size and locations of the needed action (allowing specification of the remedy). EPA believes that the available data are sufficient to select a remedy that will meet EPA's remedial objectives, described in Section Eight of this ROD. EPA is confident that the OU represents a significant step toward complete clean up of the area and will not be inconsistent with, or preclude implementation of, a final remedy. EPA has not yet selected a final remedy for the San Gabriel Valley Superfund sites, but the final remedy is expected to include, at a minimum, limiting contaminant migration in and/or from the Baldwin Park area, the Puente Valley, and other highly contaminated areas of the basin.

The Baldwin Park OU is classified as an interim action to reflect the possibility that additional projects in the Baldwin Park area may be needed. EPA will use information collected during operation of the selected remedy to help determine the need for additional actions and the nature of the final remedy. Among the critical decisions to be made are: the need for and extent of cleanup of soil contamination in the *vadose zone* (i.e., above the water table); how to address lower levels of groundwater contamination which may remain after the remedy is implemented; and the feasibility of complete restoration of all or portions of the site.

EPA has initiated six other operable units in the San Gabriel Valley in addition to the Baldwin Park OU. Three of the six projects, the Richwood, Whittier Narrows, and Suburban Water Systems Bartolo Wellfield Operable Units, resulted in the construction of a carbon adsorption treatment facility for the Richwood Mutual Water Company and installation of monitoring wells in the Whittier Narrows/Suburban Water Systems area. The other projects are in the planning or investigation stages. They are the Puente Valley Operable Unit (addressing groundwater contamination in the cities of Industry and La Puente), the El Monte Operable Unit, and the South El Monte Operable Unit.

Record of Decision (ROD) documents were signed for the Richwood and Suburban Water Systems Operable Units in 1984, 1987, 1988, and 1993. The ROD for the Whittier Narrows Operable Unit was signed in March 1993. The Whittier Narrows OU ROD and the Suburban Water Systems OU *Amended ROD* both conclude that treatment facilities are not now needed, but call for continued monitoring.

As of February, 1994, ROD documents have not been signed for the Puente Valley, El Monte, or South El Monte areas. In September 1993, EPA reached an agreement with Puente Valley area PRPs to complete a detailed investigation and evaluation of cleanup options for groundwater contamination in the Puente Valley. EPA is currently evaluating existing water quality data in the El Monte and South El Monte areas to determine the need for additional remedial investigation in these areas

6. SUMMARY OF BALDWIN PARK OPERABLE UNIT CHARACTERISTICS

Figure ROD-5 presents a simplified, *smoothed* picture of the extent of groundwater contamination in 1993 in the OU area and in other areas of the San Gabriel Basin. The most prevalent contaminants in the Baldwin Park area are the solvents TCE, PCE, and CTC.

TCE, PCE, or CTC have been detected in more than one dozen water supply wells in the Baldwin Park area at concentrations exceeding Federal and State drinking water standards. The contaminated wells are scattered across a five to 10 square mile area. EPA and the State have set safe levels for TCE and PCE in drinking water at 5 parts per billion (ppb); the State standard for CTC is 0.5 ppb. Other VOCs detected above State and/or Federal standards in the Baldwin Park area include: 1,2-dichloroethane (1,2-DCA); 1,1-dichloroethene (1,1-DCE); 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and chloroform. Table ROD-1 presents a list of VOCs detected in soil, soil gas, or groundwater in the Baldwin Park area. VOCs include contaminants detectable with EPA analytical methods 502.1, 503.1, 524.1, or 524.2. In addition, nitrate, an inorganic contaminant, has been detected at significant concentrations in groundwater at or near the proposed extraction areas, approaching the drinking water standard of 45 milligrams per liter (mg/l). Nitrate concentrations upgradient of proposed extraction areas are significantly higher, exceeding 45 mg/l over a large area and exceeding 90 mg/l northeast of the Baldwin Park area.

Figures ROD-6, ROD-7, and ROD-8 illustrate the lateral extent of groundwater contamination for TCE, CTC, and nitrate. Assumptions and simplifications made in preparing Figures ROD-6 and ROD-7 include: the figures aggregate data over a 15 month period; they aggregate data collected from over 100 wells that vary in the number and depth of perforated intervals; contaminant contours included in the figures are interpreted in areas where no wells are present; and the figures do not delineate individual plumes that may be present within the areas of contamination shown in the figure. Figure ROD-8 aggregates nitrate data over a 3 year period (nitrate has been sampled less frequently than VOCs).

Figure ROD-9 presents one of several possible interpretations of the vertical extent of TCE contamination, based on depth-specific sampling data.

The groundwater contamination appears to be the result of multiple sources, located mostly in the city of Azusa. Also see Section 11.2.

7. SUMMARY OF SITE RISKS

As part of its evaluation of the need for action, EPA has completed a preliminary assessment of the risks that could result if no action is taken to address the groundwater contamination in the Baldwin Park area (the *baseline risk assessment*). Interim remedial actions do not require a completed baseline risk assessment, although enough information must be available to demonstrate that action is necessary to stabilize the site, prevent further degradation, or achieve significant risk reduction quickly (Preamble to the NCP Final Rule, 55 Federal Register 8704).

The preliminary risk assessment estimates potential, not actual, risk. The risk estimates are based on the unlikely assumption that Federal and State drinking water standards are <u>not</u> enforced, in which case residents of the Baldwin Park area could be served contaminated groundwater extracted from within or near the OU area of contamination without treatment. This is only an assumption; groundwater served to consumers is currently believed to satisfy all enforceable drinking water standards.

The risk assessment estimates human health and environmental risks that could result from exposure to contaminated groundwater. Vadose zone remediation is not a goal of the interim action, therefore, exposure to contaminated soil or soil gas are not addressed in this preliminary risk assessment.

The risk assessment includes four steps:

7.1 Identification of Chemicals of Potential Concern (COPC):

This step involves the identification of the chemicals found in the groundwater in the OU area whose presence may contribute to risk. EPA selected as COPC contaminants detected in groundwater during EPA-sponsored sampling of two monitoring wells and 14 production wells in the Baldwin Park OU area between September 1990 and September 1991. Seventeen VOCs were detected in groundwater from the OU area. The contaminants, average concentrations, and upper 95th confidence limits are presented in Table ROD-2.

7.2 Exposure Assessment:

Two exposure pathways (routes by which the contamination can enter the body) are considered in the risk assessment: ingestion of contaminated groundwater and inhalation of VOCs released from the water into the household air during showering, bathing, cooking, or other routes. Exposure could also occur through the transport of VOCs from groundwater through soil and into ambient air or into the foundation of a building. Any exposure through soil is assumed to be insignificant because the depth to groundwater is greater than 100 feet. Dermal absorption (through skin contact) of contaminants was also considered but is believed to present a zero or insignificant risk.

The potentially exposed populations are residents and workers in the OU area and individuals visiting the Santa Fe Dam Recreation Lake. The maximally exposed population is assumed to be residents exposed to contaminated groundwater used for domestic purposes.

The monitoring data and assumptions used to characterize exposure point concentrations are analytical results from EPA-sponsored sampling of 15 of 16 wells in the Baldwin Park area between September 1990 and September 1991. Arithmetic mean chemical concentration are calculated to evaluate groundwater exposures for the average exposure scenario; the 95 percent upper confidence limit on the arithmetic mean of the data set is used for the reasonable maximum exposure scenario. These calculations assume complete blending of groundwater from the 15 wells. The blended concentration estimates are significantly less than the average or maximum concentrations measured at selected wells.

For example, the blended arithmetic mean and upper 95th confidence limit concentrations for TCE are 55.1 and 96.9 microgram/liter, respectively. The average and maximum concentrations at one well (well no. 01902169) are 335 and 450 microgram/liter.

If a chemical is not detected in a particular sample, but is detected in other groundwater samples in the same well or in another well in the OU area, a value equal to 1/2 the detection limit is used to estimate the exposure concentration. In cases where duplicate samples have been taken, the sample and duplicate results are averaged before summary statistics are calculated. It is assumed that the concentration remains constant for the duration of the exposure period.

Major exposure assumptions are summarized below. The dose from inhalation of VOCs is assumed to be equivalent to the dose from ingestion of 2 liters/day.

Exposure Factors		
	Intake Value (Adult)	
Parameter	**Average**	**Reasonable Maximum**
Ingestion Rate	2 liter/day	2 liter/day
Body Weight	70 kg	70 kg
Exposure Frequency Exposure Duration Years in Lifetime	350 days/year 9 years 70 years	350 days/year 30 years 70 years

7.3 Toxicity Assessment:

An individual's response to a contaminant depends on the dose and the contaminant's toxicity. The risk assessment makes use of quantitative information on the toxicity (i.e., the dose-response relationship) of each of the contaminants of concern. Table ROD-3 presents the toxicity factors, which take the form of reference doses (RfDs) for noncarcinogenic effects and cancer slope factors (CSFs) for carcinogenic effects. Both RfDs and CSFs are specific to the exposure route.

Cancer slope factors have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potential carcinogenic chemicals. CSFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide a conservative, upper-bound estimate of the excess lifetime cancer risk associated with the exposure. Underestimation of the actual cancer risk is highly unlikely. Cancer slope factors incorporate uncertainty factors to account for the use of animal data to predict effects on humans and other uncertainties.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects (e.g., harm to the liver). RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, which are likely to be without an appreciable risk of deleterious effects during a lifetime. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. As with CSFs, RfDs incorporate uncertainty factors and are unlikely to underestimate the potential for adverse effects.

A modified RfD approach is used to estimate the cancer risk potential from oral exposure to 1,1-DCE due to its weak evidence of carcinogenicity. The modified RfD is estimated by dividing the oral RfD by an additional safety factor of 10.

7.4 Human Health Risk Characterization

The last portion of the risk assessment integrates the toxicity and exposure assessments to estimate the potential risks to human health from exposure to site chemicals. The risk assessment examines three measures of human health risk: cancer risk, non-cancer effects, and groundwater concentrations in relation to drinking water standards. Also included is a summary of limitations of the data and methodology used in the risk assessment

7.4.1 Potential Carcinogenic Effects

The potential for carcinogenic effects is evaluated by estimating excess lifetime cancer risk, which is the probability of developing cancer during one's lifetime over the background probability of developing cancer (i.e., if no exposure to site contaminants occurred). Excess lifetime cancer risks are determined by multiplying the intake level by the cancer potency factor. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$ or 1E-6). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70 year lifetime under the specific exposure conditions at a site. The probability of developing cancer from all causes in California is approximately 250,000 out of 1,000,000 people (1 in 4). A risk of 1 out of 1,000,000 means that one additional person out of a group of 1,000,000 people could develop cancer as a result of the chemical exposure.

Because of the methods used to estimate CSFs, the excess lifetime cancer risks estimated in this preliminary risk assessment should be regarded as upper bounds on the potential cancer risks rather than an accurate representation of the true cancer risk. The actual risk could be as low as zero. Carcinogenic risks are assumed to be additive within a route of exposure. Any synergistic or antagonistic interactions are not considered.

In the Baldwin Park Risk Assessment, EPA predicts that <u>if</u> contaminated groundwater were used as a drinking water source without treatment, as many as 60 out of 1,000,000 (6×10^{-5}) persons may develop cancer during their lifetimes (based on the Reasonable Maximum Exposure). The risk was incorrectly reported as 30 out of 1,000,000 (3×10^{-5}) in the Proposed Plan. The excess lifetime cancer risk for average residential exposure through domestic use of groundwater is estimated as 10 out of 1,000,000 (1×10^{-5}). EPA generally considers excess cancer risks greater than 100 out of a million to be unacceptable.

Table ROD-4 shows carcinogenic risks associated with each contaminant of concern and each exposure pathway. The estimated excess lifetime cancer risk for reasonable maximum exposure from tap water is 3×10^{-5} for ingestion exposures (incorrectly reported as 4×10^{-5} in Table ROD-4) and 3×10^{-5} for inhalation exposures.

Since completion of the risk assessment, the inhalation slope factor for TCE has been revised downward from 0.017 $mg/kg/day^{-1}$ to 0.006 $mg/kg/day^{-1}$. Use of the revised slope factor would reduce the estimated excess lifetime cancer risk for reasonable maximum exposure from 6×10^{-5} to 5×10^{-5}.

The major chemical contributors to the estimated lifetime cancer risk based on reasonable maximum exposure are PCE and TCE, with estimated risks of 1×10^{-5} and 2×10^{-5} (assuming the revised TCE slope factor).

7.4.2 Potential Noncancer Effects

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the *Hazard Quotient* (HQ), the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose. When the hazard quotient significantly exceeds one (i.e., intake significantly exceeds RfD), there is potential for health concern. A *Hazard Index* (HI) can be generated by adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The method assumes dose additivity.

When the HI exceeds one, there is a potential for health risk. If a single HQ exceeds one, the HI will exceed one. The HI can also exceed one even if no single chemical intake exceeds its RfD.

In the Baldwin Park Risk Assessment, EPA estimates the non-cancer Hazard Index from reasonable maximum exposure to groundwater in the Baldwin Park OU area as 1.8, assuming that contaminated groundwater will be served to consumers without treatment (incorrectly reported as 0.9 in the Proposed Plan). The total HI, based on an average exposure scenario, is 1.

Non-cancer effects associated with each contaminant of concern and each exposure pathway are summarized in Table ROD-5. Noncarcinogen exposure levels do not exceed the RfDs for individual COPC. The major chemical contributors to the overall noncancer Hazard Index based on reasonable maximum ingestion and inhalation exposures are TCE with an estimated Hazard Index of 0.8, 1,1-DCE with an estimated Hazard Index of 0.4, and carbon tetrachloride with an estimated Hazard Index of 0.2.

7.4.3 Contaminant Concentrations in Relation to Drinking Water Standards

The third measure of risk examined in the risk assessment is contaminant concentrations in groundwater in the Baldwin Park area in relation to drinking water standards (the lower of the State or Federal Maximum Contaminant Level (MCL) for each contaminant). The comparison assumes that the contaminated water is delivered directly to local residents without treatment. The comparison shows unacceptably high concentrations of TCE, PCE, CTC, 1,1-DCE, 1,2-DCA, and cis-1,2-DCE. The highest TCE concentrations at Baldwin Park area wells are more than 100 times safe levels; the average TCE concentration for recent sampling of 15 Baldwin Park area wells is approximately 10 times safe levels.

The bases for EPA's decision to take action are the amount by which groundwater concentrations in the Baldwin Park area exceed acceptable levels, migration of the contamination into clean and less contaminated areas, and the importance of the San

Gabriel Basin as a source of drinking water. EPA believes that remedial action is necessary even though the carcinogenic risk levels do not exceed 100 in a million.

Table ROD-6 summarizes uncertainties associated with this preliminary risk assessment. One critical assumption is the use of average (i.e., blended) chemical concentrations measured at 15 different wells. A risk estimate that assumes exposure to groundwater produced at the more highly contaminated wells (rather than the blended concentrations assumed in the risk assessment) would be higher.

In conclusion, actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

7.5 Health Risk Characterization, Environmental Risks

The risk assessment also includes an evaluation of ecological (non human-health) impacts.

Significant impacts to potential environmental receptors are unlikely since most of the Baldwin Park area is developed (i.e., paved) and the primary exposure pathway is via contaminated groundwater. There are few environmental receptors present since urbanization has destroyed most wildlife habitat.

One of the only possible environmental exposure pathways is if significant VOC contamination reached the Santa Fe Dam Recreation Lake. PCE and TCE have been detected at production well 08000070 used to fill the man-made lake, although at low concentrations of less than 1 microgram/liter. No effects are expected since concentrations which may affect aquatic life are significantly higher. The National Ambient Water Quality Criterion (AWQC) for chronic effects resulting from exposure to PCE is 840 microgram/liter. There is no chronic AWQC for TCE.

Of greater potential significance is the presence of riparian and upland vegetation around the lake, and any construction or operating impacts on the vegetation. One plant community, Riversidian sage scrub, is considered to be a sensitive biological resource. The Riversidian sage scrub plant community is dominated by plant species that potentially provide habitat for a variety of animal species. Two special-status species, the California gnatcatcher and San Diego horned lizard, potentially occur in this habitat type.

8. DESCRIPTION OF ALTERNATIVES

The remedial objectives of the Baldwin Park OU, which guided the development and evaluation of the remedial alternatives, are:

> ... to prevent future increases in, and begin to reduce, concentrations of all VOCs in groundwater in the Baldwin Park area by limiting further migration of contaminated groundwater into clean and less contaminated areas or depths that would benefit most from additional protection and by removing contamination from the aquifer.

The Baldwin Park OU is an interim action. Accordingly, the remedy does not include *in situ* (i.e., in the aquifer) remediation standards or a restoration timeframe.

Portions of the aquifer that would benefit most from additional protection include: (i) areas downgradient of residual subsurface contamination (e.g., dense non-aqueous phase liquids (DNAPLs) or other non-aqueous phase contamination) that are clean or contaminated only by dissolved-phase contamination; and (ii) clean or less contaminated areas with active water supply wells, downgradient of more highly contaminated areas.

EPA interpreted the remedial objectives to require, at a minimum, groundwater extraction in two areas. Each of the four cleanup alternatives (Alternatives 1-4) evaluated in the Baldwin Park Operable Unit Feasibility Study includes the construction and operation of new groundwater extraction wells in two or three areas, treatment facilities to remove VOCs from groundwater (assumed, in the FS, to be *air stripping* with *vapor phase granular activated carbon*), pipelines and related conveyance facilities to deliver the treated water, and groundwater monitoring. Selected existing facilities may also be used. The differences between cleanup alternatives are in project size and recipient of the treated water. EPA also evaluated a *no action* alternative.

Existing beneficial uses of the San Gabriel Basin aquifer include municipal and domestic supply (defined in California water quality standards as "uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply").

The following sections describe the *No Action* Alternative and the four *action* alternatives.

8.1 The *No Action* Alternative

A *No Action* Alternative (more accurately described as a *No Active Response* Alternative since it includes installation and sampling of monitoring wells) provides a baseline for comparison of other cleanup alternatives. In a *No Action* Alternative, no action is taken to limit contaminant migration beyond actions already taken by water purveyors or local agencies such as the San Gabriel Basin Water Quality Authority. The *No Action* Alternative would include a monitoring program to provide early warning of increasing contaminant concentrations at existing, active water supply wells downgradient of the Baldwin Park area of contamination. Three clusters of production wells are active within approximately 1 mile of the downgradient end of the OU area of contamination (San Gabriel Valley Water Company's B4 and B6 well clusters and La Puente Valley County Water District's well cluster), but two of the three clusters are located within several hundred feet of each other. For cost-estimating purposes, it is assumed that three new monitoring wells would be required to meet the objectives of the monitoring program. The cost of constructing the monitoring wells would be approximately $ 0.4 million in initial, capital costs and less than $ 0.1 million in annual sampling costs.

The monitoring program would provide data to help predict when contaminants in downgradient production wells may increase to levels requiring installation of new wellhead treatment or modification of existing wellhead treatment facilities.

8.2 Remedial Alternative No. 1: Extract, Treat, and Distribute Approximately 19,000 gpm of Groundwater to San Gabriel Valley Water Purveyors

8.2.1 Extraction Locations and Rates

Alternative 1 calls for extraction of groundwater from two broad areas of contamination (referred to as the *upper* and *lower* areas). Figure ROD-10 shows the two areas marked *approximate extraction well locations*. The precise locations of the new extraction wells and treatment facilities would be determined during the remedial design phase of the project, after the installation and interpretation of data from new groundwater monitoring wells. The remedy may use two existing groundwater extraction wells and a planned wellhead treatment system if, during remedial design, EPA determines that they are suitably located, if agreements can be reached for their use, and if they meet other requirements of this Record of Decision.

EPA's computer simulations of groundwater flow and particle movement indicate that approximately 19,000 gpm of water must be extracted to meet EPA's objectives of controlling contaminant migration. EPA's analyses indicate that approximately 10,500 gpm of groundwater must be extracted more or less continuously in the lower area; approximately 8,500 gpm of groundwater must be extracted in the upper area. These extraction rates would limit contaminant migration out of the upper and lower areas of contamination (i.e., to *capture* or *contain* the areas of contamination).

Extraction in the lower area would limit further migration of groundwater contaminated with VOCs at concentrations approximately five to 10 times drinking water standards. Sampling results from two locations in 1989 - 1992 show average TCE concentrations between 40 and 50 ppb (the MCL for TCE is 5 ppb). Actual concentrations vary month to month and year to year. EPA sampling at a third location has shown average CTC concentrations of 12 ppb (the MCL for CTC is 0.5 ppb). Concentrations of TCE and CTC downgradient of the lower area are significantly lower.

Extraction in the upper area would limit further migration of groundwater containing VOCs at concentrations more than 200 times safe levels (e.g., more than 1,000 ppb TCE or PCE, or more than 100 ppb 1,2-DCA). The highest concentration measured at a monitoring well in the upper area exceeds 30,000 ppb PCE. Extraction in the upper area would help prevent highly contaminated areas adjacent to the likely sources of the groundwater contamination from moving into less contaminated downgradient areas, increasing the likelihood that downgradient areas could eventually be restored. Extraction in both the upper and lower areas would significantly reduce contaminant concentrations throughout the Baldwin Park area, although the rate and magnitude of the reduction are difficult to predict.

8.2.2 Treatment

After the contaminated groundwater is pumped above-ground, it would be piped to treatment facilities capable of removing VOCs from groundwater. Contaminant concentrations in the treated water would meet State or Federal Maximum Contaminant Levels for VOCs, whichever are more stringent. Initial studies completed by EPA indicate that the most efficient, proven treatment technologies will be *air stripping* (with offgas controls) or *liquid phase granular activated carbon* (LGAC). EPA's analyses indicate that both technologies are effective for most mixes of contaminants, but differ in cost depending on the VOC influent concentrations expected at the treatment facilities, which are dependent on precise extraction locations and whether groundwater from multiple extraction locations are blended and treated at a centralized facility. The two technologies may also be combined into a *treatment train*.

Liquid phase granular activated carbon transfers the contaminants from water to a charcoal-like material. *Air stripping* transfers volatile contaminants (e.g., VOCs) from water to air; *vapor phase granular activated carbon* transfers the contaminants from air to a charcoal-like material. If *air stripping* is used, it would include *vapor phase granular activated carbon* or other offgas controls to meet air emission requirements of the South Coast Air Quality Management District.

EPA also evaluated the cost, effectiveness, and feasibility of advanced oxidation processes. Advanced oxidation processes are innovative treatment methods capable of destroying contaminants. EPA's initial studies indicate that advanced oxidation processes would be considerably more expensive than either *air stripping* or LGAC.

The extracted groundwater would be treated for VOCs at one or more locations to be determined during remedial design. If treated water is supplied for local use, the most cost-effective arrangement would probably be to construct multiple treatment facilities (possibly four separate facilities).

8.2.3 Distribution/Use of Treated Water

If the necessary agreements are reached, the treated water will be supplied to agencies that directly or indirectly supply drinking water to San Gabriel Valley residents and businesses (water purveyors). Excess water would be piped to spreading basins, the San Gabriel River channel, or tributary flood control channels operated by the Los Angeles County Department of Public Works for recharge into the aquifer when water purveyors are not able to use all of the treated water.

EPA expressed a preference to supply treated water to purveyors, rather than for recharge, due to lower pumping costs (although higher initial capital costs) and the risk that existing recharge areas may not offer enough recharge capacity during winter and spring rainy season. There is excess capacity in recharge areas for much, but not all of the year. In each of the last two years, existing users of Baldwin Park area spreading grounds used all of the available capacity for several consecutive months. In contrast, supplying treated water to purveyors has the advantage that purveyors should be able to accept water close to year-round, minimizing the risk of not being able to distribute extracted water during winter and spring months.

In the FS it is assumed that water would be supplied to San Gabriel Valley Water Company, Suburban Water Systems, Covina Irrigating Company, and the city of Glendora, although other purveyors could substitute. There are pros and cons to supplying each purveyor which could potentially accept treated water. Some purveyors could distribute large quantities of water year-round; others could distribute less water for only part of the year. Some purveyors are located near likely treatment plant locations (requiring minimal pipeline); others are located further away or at higher elevations (requiring more pumping). Purveyors also vary in how much they are willing to pay for additional supplies, in whether they could accept water without first resolving water rights issues (e.g., exporting water from the basin), and in their expertise in operating treatment facilities.

8.2.4 Project Duration, Cost, and Evaluation

The project would operate for an initial period of five years, after which EPA will conduct a formal assessment of the project's effectiveness. The results of the assessment may lead to continued operation of the project as is, or recommended modifications in the extraction rates and locations or other project components. The project would be expected to operate until contaminant concentrations decrease sufficiently that continued efforts to limit the migration of contaminated groundwater or remove contaminant mass are no longer necessary. The assessment will include an evaluation of the effects of the operation of nearby public water supply wells on the attainment of EPA's remedial objectives.

It is estimated that implementation of Alternative 1 would require approximately 36 months from the date the ROD is signed. During this period, EPA intends to negotiate an agreement for funding of the selected remedy, and then proceed with design, construction, and initial testing of the equipment to make sure it functions properly.

The estimated cost of Alternative 1 is $47 million in capital costs and $4 million in annual operation and maintenance costs. More than half of the capital costs would be for construction of treatment facilities; the remainder of the costs would be for well systems, pipelines, and land acquisition. The estimate assumes that new treatment facilities must be constructed, although one or more existing or planned facilities may be used. The biggest contributor to the operating costs would be the cost of regenerating or replacing the granular activated carbon used in the treatment process. The cost estimates for Alternatives 1-4 each include an added 35% to account for the risk of higher than expected labor or material costs, unforeseen delays, and other factors that may increase costs.

8.3 Remedial Alternative No. 2: Extract, Treat, and Distribute Approximately 29,000 gpm of Groundwater to San Gabriel Valley Water Purveyors and Recharge Areas

Alternative 2 differs from Alternative 1 in that it involves the extraction of groundwater from three (rather than two) broad areas of contamination (the *lower*, *middle* and *upper* areas). See Figure ROD-10. Extraction in the lower and upper areas would be the same as described for Alternative 1. Alternative 2 would add extraction in the middle area to prevent further degradation of the area in between the upper and lower extraction areas and remove additional contaminants. Approximately 10,000 gpm of water would need to be extracted in the middle area to provide the additional migration control. The additional 10,000 gpm would be distributed in part to water purveyors and in part to the San Gabriel River channel and the Irwindale Spreading Grounds. In the FS it is assumed that water would be supplied to San Gabriel Valley Water Company, Suburban Water Systems, Covina Irrigating Company, the city of Glendora, and the city of Azusa, although other purveyors could substitute.

The estimated cost of Alternative 2 is $65 million in initial, capital costs and $7 million in annual operation and maintenance costs. Implementation may take longer than Alternative 1 due to the need to construct additional facilities and reach agreements to distribute approximately an additional 10,000 gpm of treated water.

8.4 Remedial Alternative No. 3: Extract, Treat, and Distribute Approximately 29,000 gpm of Groundwater to San Gabriel Valley Water Purveyors and Metropolitan Water District of Southern California

Alternative 3 shares the same extraction component as Alternative 2, and the same water use option for groundwater extracted from the lower area, but differs in the disposition of extracted groundwater from the upper and middle areas. Instead of supplying treated water to local purveyors, treated water would be piped from the treatment facilities to Metropolitan's *Middle Feeder* pipeline, which passes through the city of Baldwin Park. Metropolitan would export the treated water to its member agencies located in the northeastern and south central sections of Los Angeles County during summer months or drought years. Because Metropolitan possesses only negligible pumping rights in the San Gabriel Basin, Metropolitan would be required to replace every gallon of exported water by recharging an equivalent amount of imported water during the winter or spring offpeak months when imported water is relatively abundant. This type of operation is often described as a *conjunctive* use operation.

Metropolitan may distribute the treated water to secondary recipients during offpeak winter and spring months. Possible arrangements include direct recharge from the treatment facilities, or discharge of the treated water into Metropolitan's existing conveyance facilities for distribution (*wheeling*) to local water purveyors. The local water purveyors would use the treated groundwater in lieu of pumping clean groundwater.

The estimated cost of Alternative 3 is approximately $76 million in capital costs and $9 million in annual operation and maintenance costs, higher than for Alternatives 1 or 2. The actual cost to EPA is assumed to be equal to the cost of Alternative 2, however. Metropolitan would be expected to fund the difference in cost, referred to as an *enhancement cost*.

8.5 Remedial Alternative No. 4: Extract, Treat, and Distribute Approximately 29,000 gpm of Groundwater to Metropolitan Water District of Southern California

Alternative 4 shares the same extraction component as Alternatives 2 and 3, but differs in the disposition of the treated water from the upper and middle areas. All treated water would be piped from a treatment facility to Metropolitan's Middle Feeder pipeline.

The estimated cost of Alternative 4 is approximately $78 million in capital costs and $10 million in annual operation and maintenance costs, higher than for Alternatives 1, 2, or 3. The actual cost is assumed to be equal to the cost of Alternative 2, however. Metropolitan would be expected to fund the difference in cost, referred to as an *enhancement cost*.

9. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section ranks the five remedial alternatives in relation to the nine Superfund evaluation criteria listed in 40 CFR Part 300.430.

9.1 Overall Protection of Human Health and the Environment

Remedial Alternatives 1-4 protect human health and the environment without substantial negative impacts. Alternatives 2, 3, and 4 would include additional extraction in a *middle* portion of the aquifer not included in Alternative 1. The additional extraction would provide additional protection for the area in between the upper and lower extraction areas and remove additional contaminant mass. Negative impacts associated with Alternatives 1-4 include the disruption that would result from installation of pipelines and other components of the remedy and the impacts of handling, treating, and disposing of treatment residuals (e.g., air emissions and spent carbon).

Alternative 1 (and Alternatives 2, 3, and 4) would reduce short- and long-term risks to human health and the environment by inhibiting contaminant migration from two highly contaminated portions of the aquifer (the upper and lower areas) to less contaminated areas or depths to reduce the impact of continued contaminant migration on downgradient water supply wells and to protect future uses of less contaminated and uncontaminated areas. Alternatives 1-4 would reduce the toxicity, mobility, and volume of the contaminants and remove significant contaminant mass from the aquifer. The VOC treatment technologies that would be used are effective in meeting Federal and State drinking water standards for VOCs.

Alternative 1 (and Alternatives 2 and 3, but not Alternative 4) also offer the benefit of providing treated water to purveyors whose wells are threatened by continued contaminant migration, providing the vulnerable purveyors with an alternative water supply.

The no-action alternative provides the least overall protection of human health and the environment. It would not provide any additional migration control beyond that provided by projects that may be built by parties other than EPA (e.g., by local water purveyors or local water agencies). Contaminant concentrations in a significant portion of the aquifer exceed State or Federal drinking water standards.

Limitations of the no-action alternative include: the increased potential for human exposure; leaving the burden of constructing treatment facilities to water purveyors; the increased cost and difficulty of operating existing treatment facilities if more highly contaminated groundwater reaches existing facilities; the increased likelihood that future increases in contaminant concentrations at active water supply wells would result in emergencies requiring immediate actions not consistent with long-term remediation goals (e.g., pumping in relatively clean portions of the aquifer, potentially spreading the contamination); and the increased eventual cost, difficulty, and time required for containment or restoration of the aquifer. (If no action is taken, continued contaminant migration would result in the need to treat larger volumes of contaminated water and may result in the increased presence of vinyl chloride or other VOC degradation products that are more difficult to treat or more toxic than the parent compounds.)

Alternatives 1-4 may not achieve final cleanup levels for the groundwater. MCLs/MCLGs *in situ* are not ARARs for this action because they are beyond the scope of this interim action.

9.2 Compliance with ARARs

Each of Alternatives 1-4 is configured to comply with the ARARs described in Section 10 of this ROD. No differences are expected among these remedial alternatives in compliance with ARARs. No ARARs waivers are expected to be needed.

9.3 Long-Term Effectiveness and Permanence

This evaluation criterion assesses the extent to which each remedial alternative reduces risk after the remedial response objectives are met. Residual risks in this interim remedy could result from exposure to contaminated groundwater not removed from the aquifer, or exposure to used *granular activated carbon* or other treatment residuals. The performance of the alternatives in relation to this criterion is evaluated by estimating the extent to which each alternative prevents the migration of contamination into less contaminated areas and the rate of contaminant removal.

Alternatives 2, 3, and 4 would provide the greatest long term effectiveness because they include additional extraction in three subareas, which would limit downgradient and vertical migration in and beyond the upper, middle, and lower subareas and remove significant contaminant mass from all three subareas.

Alternative 1 would provide the same protection in and downgradient of the upper and lower subareas, but lacks the additional benefits of extraction in the middle subarea. These benefits are added protection for the area in between the upper and lower extraction areas and removal of additional contaminant mass.

The no-action alternative would not limit further downgradient contaminant plume migration, or remove contaminant mass, beyond that provided by projects that may be built by parties other than EPA.

Figures ROD-11 and ROD-12 depict the results of computer simulations that provide a measure of the effect of the no-action alternative and the remedial alternatives on the movement of the contamination in the OU area. The figures depict the movement of particles representing selected drops of contaminated groundwater. Particles that terminate at black dots indicating extraction well locations are captured, representing contaminant molecules that are removed from the aquifer. Particles that extend past extraction well locations represent an increase in downgradient contaminant concentrations or a downgradient expansion of the area of contamination.

Figure ROD-12 illustrates the effectiveness of Alternatives 2, 3, and 4. The effectiveness of Alternative 1 would be similar to that shown in the figure, except that particles originating in Subarea 2 (the middle subarea) would be captured in Subarea 3 rather than Subarea 2. In each of Alternatives 1-4, most of the particles shown in the figure are captured by OU wells in Subareas 1 and 3. A few particles continue beyond the downgradient margin of the OU area of contamination, although the downgradient distances traveled are much shorter than shown for the no-action alternative.

There are some other minor differences in effectiveness between Alternatives. Alternatives 1, 2, and 3 may be slightly more effective than Alternative 4 because of reductions in pumping at existing water supply wells at the periphery of Subarea 3. Alternative 1 may also be slightly more effective than Alternatives 2, 3, and 4 if Alternatives 2, 3, or 4 include significant recharge in areas that increases the rate of contaminant migration downgradient of recharge areas. Alternative 1 assumes no recharge of treated groundwater and Alternative 2 assumes recharge of 6,500 gpm of treated water. Alternatives 3 and 4 assume no recharge, a project in which treated water is supplied to Metropolitan could result in recharge during offpeak periods.

Figure ROD-11 depicts the extent and degree of contaminant migration for the no-action alternative. The figure shows that some contaminated groundwater is extracted by an existing well cluster in the OU area, but much of the contaminated groundwater continues to migrate unimpeded. This effect is illustrated by the number of particles moving beyond the current downgradient extent of contamination and the distances that these particles travel.

Alternatives 1-4 may result in air emissions (if *air stripping* is used) and generate spent carbon or other treatment residuals. Air emissions and risks associated with treatment residuals are expected to be within acceptable levels. The magnitude of the residual risks from treatment residuals for Alternative 1 would be less than for Alternatives 2, 3, and 4 because of the lower extraction rate.

9.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

This criterion addresses the statutory preference for selecting remedial actions employing treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of the hazardous substances as a principal element of the action.

Alternatives 1, 2, 3, and 4 all satisfy the statutory preference for treatment. Each of these four alternatives would employ treatment processes that would significantly reduce the volume of hazardous contaminants by inhibiting contaminant migration, and reduce the toxicity and volume of hazardous contaminants by treating the groundwater so that it meets MCLs for VOCs.

The VOC treatment technologies assumed in Alternatives 1-4, *LGAC or air stripping with offgas controls*, are technically feasible and effective in meeting ARARs for VOCs in the extracted and treated groundwater. Treatment of the contaminated groundwater with LGAC or *air stripping* with carbon offgas controls would substantially reduce the volume of contaminated media and mobility of the contaminants by transferring contaminants from groundwater to the GAC. This contaminated GAC would require disposal or regeneration.

The Alternatives are similar in their capability to satisfy this criterion. The major difference is the omission of groundwater extraction in the *middle area* in Alternative 1. This difference among alternatives is described in the *long-term effectiveness and permanence* criterion and is not duplicated here.

9.5 Short-Term Effectiveness

This criterion evaluates the effects of each remedial alternative on human health and the environment during the construction and start-up of the remedy. It also addresses the time elapsed during construction and start-up.

Alternative 1 may be designed and built more quickly than Alternatives 2-4 because of its smaller size, although any of the alternatives could be built in phases to minimize delay. There may also be differences in the number or severity of institutional obstacles, but these differences are taken into account in the *implementability* criterion and not duplicated here. We conclude that Alternatives 1-4 are similar in short-term effectiveness and do not present unmitigable risks to the community, workers, or the environment during construction and implementation.

9.6 Implementability

This criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation. Of particular importance in the Baldwin Park OU is the administrative feasibility of the Alternatives, especially the need for agreements with parties other than EPA to distribute treated water.

The technical feasibility of Alternatives 1-4 is similar. The extraction, treatment, and conveyance technologies included in all of the Alternatives are widely used and are generally known to be proven and reliable. All of the Alternatives share some risk that higher than estimated contaminant concentrations could interfere with the ability of the treatment facility to attain treatment objectives.

Numerous administrative obstacles must be overcome to implement any of the alternatives, but Alternative 1 is potentially more feasible than Alternatives 2-4 due to the lower amount of treated water that needs to be distributed (approximately 10,000 gpm less water - 1/3 less). This would result in the need to reach agreements with fewer parties that would receive treated water from an OU; acquisition of less property and/or fewer easements for the construction of extraction wells, treatment facilities, and conveyance facilities (and resolving other issues associated with a large construction project in a developed area); and acquisition of fewer offsets for air emissions if *air stripping* is used. Agreements with recipients of treated water will need to specify the amount of treated water to be delivered, the delivery location, responsibility for any necessary capital improvements to the recipient's distribution system to accept the water, and operational, liability, financial, and other arrangements. Resolving these issues could potentially delay implementation of the project.

If water purveyors accept treated water, they will be responsible for obtaining approval for modifications to their water supply permits. If treated water is recharged, arrangements would need to be made with the Los Angeles County Department of Public Works for use of its spreading grounds. An agreement may not guarantee the required amount of spreading capacity because of competition for use of available spreading capacity.

In addition, for Alternatives 3 and 4, the following administrative feasibility issues associated with the involvement of Metropolitan would need to be resolved.

• Arrangements may need to be made with secondary recipients for distribution of treated water during offpeak periods (i.e., winter and spring months);

• Arrangements would need to be made with the LACDPW for recharge of imported water. Although imported surface water is already recharged for replenishment and cyclic storage, significant additional amounts would increase the risk that there may insufficient capacity in existing recharge areas.

• Metropolitan would need to reach agreement with the Watermaster (and/or obtain court approval) for export of additional water from the basin and the storage of imported water recharged in the basin. The existing water rights agreement (the Alhambra Judgment) currently prohibits any additional export of extracted groundwater from the basin without Watermaster and/or court approval. Metropolitan and Watermaster are in their second year of negotiations over the terms of an agreement.

• Before accepting treated water, Metropolitan may need to reach agreement with the Watermaster (and/or obtain court approval) to increase the available storage capacity in the basin by modifying the operating criteria in the Alhambra Judgment. Metropolitan may also need to mitigate adverse effects of higher or lower water levels.

• Metropolitan staff have stated the possibility that Metropolitan would impose more stringent treatment requirements, which would require the construction of additional treatment facilities.

• Financial agreements with Metropolitan for funding of system enhancements would be necessary. Enhancement costs are capital or operating costs that are not necessary for attainment of remedial objectives. State or Metropolitan funding may trigger the need for Metropolitan to prepare an Environmental Impact Report to comply with the California Environmental Quality Act (CEQA).

• Financial and operation agreements (including staffing, maintenance schedules) may be needed to arrange for seasonal changes in the operating scenario if the level of treatment required by recipients of treated water during offpeak periods differs from Metropolitan's requirements.

• Acquisition of property for a treatment facility could be more difficult because of Metropolitan's likely requirement that a single centralized treatment facility be constructed.

These disadvantages may be partially offset by Metropolitan's expertise in constructing large water supply projects, and by eliminating the need to reach agreements with local water purveyors if arrangements for distribution of treated water during offpeak periods do not involve local purveyors.

9.7 Cost

The following table presents estimated capital costs, O&M costs, and the estimated *present worth* of each remedial alternative. The present worth is estimated using discount rates of 3, 5, and 10 percent, and a base period of 30 years. The assumption of a 30-year project life reflects EPA Superfund guidance; it does not reflect any specific finding regarding the duration of the remedy. The costs are considered order-of-magnitude level estimates (i.e., the true project cost may be 50% higher or 30% lower than the estimated cost).

Estimated Costs of Remedial Alternatives
(millions of dollars)

Alternative	Short-Term Capital Costs	Annual O&M Costs[1]	Net Present Worth at 3, 5, and 10% Discount Rates (assuming 30 year lifetime)		
			3 Percent	5 Percent	10 Percent
No-Action[2]	0.4	less than 0.1	1	0.9	0.8
1	47	3.5 to 5.0	116-145	101-124	80-94
2	65	5.9 to 7.8	182-217	156-184	121-138
3[3]	65	5.9 to 7.8	182-217	156-184	121-138
4[3]	65	5.9 to 7.8	182-217	156-184	121-138

[1]A range of O&M costs is provided to account for the range of potential purveyor reimbursement rates for treated water from $25 to $75/acre-foot.
[2]The No-action alternative costs include only those costs associated with the no-action monitoring program. Additional long-term financial impacts of this alternative have not been estimated.
[3]Actual project costs for Alternatives 3 and 4 would be greater than indicated due to requirements associated with the involvement of Metropolitan. It is assumed that Metropolitan would pay for any costs resulting from water supply or other requirements that are not necessary for attainment of remedial objectives (*enhancement costs*), making the net project cost to EPA or PRPs the same as for Alternative 2.

9.8 State Acceptance.

In a letter dated August 12, 1993, the State of California (Cal-EPA Department of Toxic Substances Control) concurred with EPA's *proposed* remedy for the Baldwin Park OU. In a second letter from Margaret Felts, Deputy Director, Site Mitigation

Program, Department of Toxic Substances Control, the State of California concurred with EPA's *selected* remedy.

9.9 Public Acceptance.

In addition to the State, twenty-five individuals and organizations submitted over 400 comments on EPA's Remedial Investigation, Feasibility Study, and Proposed Plan for the Baldwin Park OU. These comments, and EPA's responses, are presented in the Part III of this ROD (the *Responsiveness Summary*). Most commenters submitted between one and ten comments. One commentor, a recipient of General Notice of Liability for the Baldwin Park OU, submitted approximately 250 comments.

Several comments expressed support for EPA's proposed remedy; others did not. Most commented upon were two aspects of the Alternatives: the size of the project (i.e., the amount or rate of contaminated groundwater extracted from the aquifer); and the disposition of the treated water. EPA's Proposed Plan calls for extraction of approximately 19,000 gpm of contaminated groundwater from two Subareas, as in Alternative 1. Several individuals and two water agencies recommended that EPA select the larger project included in Alternatives 2, 3, and 4 (extraction of approximately 29,000 gpm of contaminated groundwater from three Subareas). Several businesses and business organizations recommended that EPA select a smaller project.

Several individuals, local organizations, and water agencies also recommended that EPA select Metropolitan as the recipient of the treated water (a component of Alternatives 3 and 4), often on the assumption that doing so would increase the extent or decrease the cost of the clean up.

10. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

This section discusses Applicable or Relevant and Appropriate Requirements (ARARs) for the Baldwin Park OU. Under Section 121(d)(1) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 (collectively, CERCLA), 42 U.S.C. Section 9621(d), remedial actions must attain a level or standard of control of hazardous substances which complies with ARARs of Federal environmental laws and more stringent State environmental and facility siting laws. Only State requirements that are more stringent than Federal ARARs, are legally enforceable and consistently enforced, and identified in a timely manner may be ARARs. The California

Department of Toxic Substance Control ("DTSC") is the lead State agency for CERCLA matters. In accord with a directive by Margaret C. Felts, Deputy Director Site Mitigation Program, EPA has communicated with DTSC with regards to ARARs and has relied on DTSC for identification of State ARARs.

Pursuant to Section 121(d) of CERCLA, the on-site portion of a remedial action selected for a Superfund site must comply with all ARARs. Any portion of a remedial action which takes place off-site must comply with all laws legally applicable at the time the off-site activity occurs, both administrative and substantive.

An ARAR may be either "applicable," or "relevant and appropriate," but not both. According to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300), "applicable" and "relevant and appropriate" are defined as follows:

- *Applicable requirements* are those cleanup standards, standards of control, or other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a State in a timely manner and that are more stringent than Federal requirements may be applicable. "Applicability" implies that the remedial action or the circumstances at the site satisfy all of the jurisdictional prerequisites of a requirement.

- *Relevant and appropriate requirements* are those cleanup standards, standard of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those State standards that are identified in a timely manner and that are more stringent than Federal requirements may be relevant and appropriate.

Requirements are also classified as *chemical-specific*, *location-specific*, or *action-specific*.

• *Chemical-specific* ARARs are health- or risk-based concentration limits, numerical values, or methodologies for various environmental media (i.e., groundwater, surface water, air, and soil) that are established for a specific chemical that may be present in a specific media at the site, or that may be discharged to the site during remedial activities. These ARARs set limits on concentrations of specific hazardous substances, pollutants, and contaminants in the environment. Examples of this type of ARAR are ambient water quality criteria and drinking water standards.

• *Location-specific* requirements set restrictions on certain types of activities based on site characteristics. Federal and State location-specific ARARs are restrictions placed on the concentration of a contaminant or the activities to be conducted because they are in a specific location. Examples of special locations possibly requiring ARARs include flood plains, wetlands, historic places, and sensitive ecosystems or habitats.

• *Action-specific* requirements are technology- or activity-based requirements which are triggered by the type of remedial activity. Examples are Resource, Conservation and Recovery Act (RCRA) regulations for waste treatment, storage or disposal.

Neither CERCLA nor the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (400 C.F.R. Part 300) provides across-the-board standards for determining whether a particular remedy will result in an adequate cleanup at a particular site. Rather, the process recognizes that each site will have unique characteristics that must be evaluated and compared to those requirements that apply under the given circumstances. Therefore, ARARs are identified on a site-specific basis from information about specific chemicals at the site, specific features of the site location, and actions that are being considered as remedies.

The following section outlines the ARARs that apply to this site.

10.1 Chemical-Specific ARARs

10.1.1 Federal Drinking Water Standards

Section 1412 of the Safe Drinking Water Act (SDWA), 42 U.S.C. Section 300g-1, "National Water Regulations"; National Primary Drinking Water Regulations, 40 CFR Part 141.

EPA has established Maximum Contaminant Levels (MCLs) (40 CFR Part 141) under the Safe Drinking Water Act (SDWA) to protect public health from contaminants that may be found in drinking water sources. These requirements are applicable at the tap for water provided directly to 25 or more people or which will be supplied to 15 or more service connections. The MCLs are applicable to any water that would be served as drinking water. Under NCP Section 300.430(f)(5), remedial actions must generally attain MCLs and non-zero Maximum Contaminant Level Goals (MCLGs) for remedial actions where the groundwater is a current or potential source of drinking water.

The groundwater at the Baldwin Park OU is an existing and potential source of drinking water. However, since the Baldwin Park OU remedial action is an interim action, chemical-specific cleanup requirements for the aquifer such as attaining MCLs and non-zero MCLGs, which would be ARARs for a final remedy, are not ARARs for this interim action. (See NCP, 55 Fed. Reg. 8755.) Nevertheless, EPA has determined that for the treatment plant effluent from the Baldwin Park OU, the Federal Primary and any Secondary Maximum Contaminant Levels (MCLs) for VOCs and any more stringent State of California Primary MCLs for VOCs are relevant and appropriate and must be attained regardless of the end use or discharge method for the treated water. In addition, treated water that is discharged to surface water shall meet National Pollutant Discharge Elimination System (NPDES) discharge requirements.

For treated water which will be put into a public water supply, all legal requirements for drinking water in existence at the time that the water is served will have to be met because EPA considers serving of the water to the public (at the tap) to be off-site. Complying with all applicable requirements for drinking water at the tap will also require attainment of the MCL for nitrate prior to serving the water to the public. Since these are not ARARs, these requirements are not "frozen" or fixed as of the date of the ROD. Rather, they can change over time as new laws and regulations applicable to drinking water change. See NCP, 55 Fed. Reg. 8758 (March 8, 1990).

10.1.2 State Drinking Water Standards

California Safe Drinking Water Act, Health and Safety Code, Division 5, Part 1, Chapter 7, section 4010 et seq., California Domestic Water Quality Monitoring regulations, CCR Title 22, Division 4, Chapter 15, section 64401 et seq.

California has also established drinking water standards for sources of public drinking water, under the California Safe

Drinking Water Act of 1976, Health and Safety Code Sections 4010.1(b) and 4026(c). California has promulgated primary MCLs for VOCs. Several of the State MCLs are more stringent than Federal MCLs. In these cases, EPA has determined that the more stringent State MCLs for VOCs are relevant and appropriate for the treatment plant effluent from the Baldwin Park OU interim remedy. VOCs for which there are more stringent State standards include: benzene; carbon tetrachloride; chlorobenzene; 1,2-dibromoethane; 1,2-dichloroethane (1,2-DCA); 1,1-dichloroethene (1,1-DCE); cis-1,2-DCE; trans-1,2-DCE; vinyl chloride; and xylenes. There are also some chemicals where State MCLs exist but there are no Federal MCLs. EPA has determined that these State MCLs are relevant and appropriate for the treated water prior to discharge or delivery to the water purveyor. VOCs for which there are no Federal MCLs but for which State MCLs exist are: 1,1-DCA; trichloroflouromethane (Freon 11); and 1,1,2-trichloro-1,2,2-triflouroethane (Freon 113). The Federal and State Primary MCLs for these compounds are listed in Table ROD-1.

Water served as drinking water is required to meet MCLs at the tap, not MCLGs. However, EPA does retain the authority to require changes in the remedy if necessary to protect human health and the environment, including changes to previously selected ARARs. See, 40 CFR Sections 300.430(f)(1)(ii)(B)(1) and 300.430(f)(5)(iii)(C). If EPA receives new information indicating the remedy is not protective of public health and the environment, EPA would review the remedy and make any changes necessary to ensure protectiveness.

10.2 Location-Specific ARARs

No location-specific ARARs were identified for the Baldwin Park OU.

10.3 Action-Specific ARARs

10.3.1 Clean Air Act, 42 U.S.C. section 7401 et seq.

<u>Rules and Regulations of the South Coast Air Quality Management District</u>

The Baldwin Park OU remedy may include *air stripping*, triggering action-specific ARARs with respect to air quality.

The Clean Air Act regulates air emissions to protect human health and the environment, and is the enabling statute for air quality programs and standards. The substantive requirements of programs provided under the Clean Air Act are implemented primarily through Air Pollution Control Districts. The South

Coast Air Quality Management District (SCAQMD) regulates air quality in the San Gabriel Valley.

The SCAQMD has adopted rules that limit air emissions of identified toxics and contaminants. The SCAQMD Regulation XIV, comprising Rule 1401, on new source review of carcinogenic air contaminants, is applicable for the Baldwin Park OU. SCAQMD Rule 1401 requires that best available control technology (BACT) be employed for new stationary operating equipment, so the cumulative carcinogenic impact from air toxics does not exceed the maximum individual cancer risk limit of ten in one million (1 x 10^{-5}). EPA has determined that Rule 1401 is applicable for the Baldwin Park OU because compounds such as PCE and TCE are present in groundwater, and release of these compounds to the atmosphere exceeding SCAQMD requirements unless controls are implemented.

The substantive portions of SCAQMD Regulation XIII, comprising Rules 1301 through 1313, on new source review are also ARARs for the Baldwin Park OU.

The SCAQMD also has rules to limit the visible emissions from a point source (Rule 401), to prohibit discharge of material that is odorous or causes injury, nuisance or annoyance to the public (Rule 402), and to limit downwind particulate concentrations (Rule 403). EPA has determined that these rules are also ARARs for the Baldwin Park OU interim remedy.

10.3.2 Water Quality Standards for Discharges of Treated Water to Surface Waters or Land

<u>State Standards</u>

For any discharge to land, including recharge at a spreading basin, or discharge to surface water, that occurs on-site, the discharged water must meet all action-specific ARARs for such discharge. The ARAR applicable to the discharged water is:

- The Los Angeles Regional Water Quality Control Board's Water Quality Control Plan for the Los Angeles River Basin (the "Basin Plan"), which incorporates State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California." Resolution No. 68-16 requires maintenance of existing State water quality unless it is demonstrated that a change will benefit the people of California, will not unreasonably affect present or potential uses, and will not result in water quality less than that prescribed by other State policies.

State Standards - Discharges to Land

In order to comply with the Basin Plan, any treated groundwater that is discharged to land will be treated to concentrations below Federal MCLs or State MCLs for VOCs, whichever is more stringent. In addition, any nitrate concentrations in the water to be recharged will have to be similar to or lower than the levels of these substances in the portion of the aquifer where the recharge will occur. The quality, quantity, and duration of the discharge will be considered with respect to the existing water quality.

State Standards - Discharges to Surface Water
CERCLA Section 104(b) Activities

During the time period of RD/RA activities at the Baldwin Park OU, additional CERCLA section 104(b) activities will be taking place. During these additional CERCLA section 104(b) activities, EPA anticipates that there may be temporary discharges of treated water to the San Gabriel River and its tributaries (collectively the San Gabriel River). The ARAR for any treated water that is generated and discharged to the San Gabriel River as part of a CERCLA section 104(b) activity would be the NPDES program, which is implemented by the Regional Board. In establishing effluent limitations for such discharges, the Regional Board considers the Basin Plan, which incorporates Resolution 68-16, and the best available technology economically achievable (BAT). See, Cal. Water Code section 13263.

Since the Regional Board did not identify specific substantive discharge requirements or technology standards for discharges resulting from CERCLA section 104(b) activities, EPA has reviewed the Basin Plan and considered BAT and has made certain determinations for the discharge of water generated by CERCLA section 104(b) activities to the San Gabriel River. In order to comply with this ARAR, any treated groundwater that would be discharged pursuant to CERCLA section 104(b) activities to the San Gabriel River would be treated to meet Federal MCLs or State MCLs for VOCs, whichever is more stringent.

The treated water may also contain nitrate. The Basin Plan states that the level of nitrate shall not exceed 36 mg/l (as NO_3) in water designated for use as domestic or municipal supply. According to the Basin Plan, the San Gabriel River is designated for municipal or domestic water supply. Therefore, 36 mg/l nitrate would be an ARAR for CERCLA section 104(b) activities resulting in discharges associated with the OU.

EPA has stated that "studies and investigations undertaken pursuant to CERCLA section 104(b), such as activities conducted during RI/FS, are considered removal actions." (55 Fed. Reg. 8756) It is EPA's policy that removal actions "will comply with ARARs to the extent practicable, considering the exigencies of the circumstances." (55 Fed. Reg. 8756).

Some CERCLA section 104(b) activities that will occur during the time of RD/RA are temporary high flow, high volume discharges (e.g., discharges resulting from spinner logging/depth specific sampling of water supply wells and aquifer testing). EPA has considered BAT for these CERCLA section 104(b) activities. For CERCLA section 104(b) activities that result in temporary high flow, high volume discharges, EPA evaluated four options for meeting the primary Federal and State MCLs for VOCs and nitrate: (i) direct discharge to an existing drinking water distribution system; (ii) on-site storage, then disposal at a RCRA-approved hazardous waste facility; (iii) discharge into a sanitary sewer for treatment at a wastewater treatment plant; and (iv) on-site treatment, then discharge into flood control channels.

For reasons similar to those faced and addressed during previous spinner logging/depth specific sampling, EPA reached the conclusion that compliance with ARARs was not practicable considering the exigencies of the circumstances for CERCLA 104(b) activities resulting in temporary high flow, high volume discharges of water. EPA has determined that for CERCLA 104(b) activities <u>not</u> resulting in temporary high flow, high volume, discharges of water compliance with ARARs <u>is</u> practicable considering the exigencies of the circumstances.

<u>State Standards - Discharge to Surface Water RD/RA Activities</u>

RD/RA activities may also include the discharge of treated water to surface waters. Unlike the CERCLA section 104(b) activities, the RD/RA activities shall be undertaken in compliance with ARARs unless a waiver is attained. Because no ARAR waivers are contemplated for the RD/RA for the Baldwin Park OU, all RD/RA activities shall be undertaken in compliance with ARARs.

As noted above, the ARAR for any treated water that is discharged to surface waters is the NPDES Program which is implemented by the Regional Board. In establishing effluent limitations for such discharges, the Regional Board considers the Basin Plan, which incorporates Resolution 68-16, the Inland Surface Water Plan and Temperature Plan for Surface Waters, and the best available technology economically achievable (BAT). <u>See</u>, Cal. Water Code section 13263.

Since the Regional Board did not identify specific substantive discharge requirements or technology standards for such discharges, EPA has reviewed the Basin Plan (with related documents) and considered BAT and has made certain determinations for the RD/RA discharges to surface waters. In order to comply with this ARAR, any groundwater that will be discharged to surface waters on-site must be treated to meet primary Federal MCLs or State MCLs for VOCs, whichever is more stringent.

The treated water will also contain nitrate. The Basin Plan states that the level of nitrate shall not exceed 36 mg/l in water designated for use as domestic or municipal supply. According to the Basin Plan, the San Gabriel River is designated for municipal or domestic water supply. Therefore, the 36 mg/l is an ARAR for the RD/RA discharges associated with the OU.

10.3.3 California Hazardous Waste Control Act

RCRA, passed by Congress in 1976 and amended by the Hazardous and Solid Waste Amendments of 1984, contains several provisions that are ARARs for the Baldwin Park OU. The State of California has been authorized to enforce its own hazardous waste regulations (California Hazardous Waste Control Act) in lieu of the Federal RCRA Program administered by the EPA. Therefore, State regulations in the California Code of Regulations (CCR), Title 22, Division 4.5, Environmental Health Standards for the management of Hazardous Wastes (hereinafter the State HWCA Regulations), are now cited as ARARs instead of the Federal RCRA Regulations. State regulations under Federally authorized programs are considered Federal requirements, i.e., Federal ARARs.

The contaminated groundwater is not a listed RCRA waste. However, the contaminants are sufficiently similar to RCRA wastes that EPA has determined that portions of the State's HWCA Regulations are relevant and appropriate.

An air stripper or GAC contactor would qualify as a RCRA miscellaneous unit if the contaminated water constitutes RCRA hazardous waste. EPA has determined that the substantive requirements for miscellaneous units set forth in Sections 66264.601 -.603 and related substantive closure requirements set forth in 66264.111-.115 are relevant and appropriate for the air stripper or GAC contactor. The miscellaneous unit and related closure requirements are relevant and appropriate because the water is similar to RCRA hazardous waste, the air stripper or GAC contactor appear to qualify as a miscellaneous unit, and the air stripper or GAC contactor should be designed, operated, maintained and closed in a manner that will ensure the protection of human health or the environment.

The land disposal restrictions (LDR), 22 CCR Section 66268 are relevant and appropriate to discharges of contaminated or treated groundwater to land, including the discharge of treated water to spreading basins. The remedial alternatives presented do not include land disposal of untreated groundwater. Because of the uncertainty in the levels of contamination and volumes of water to be derived from monitoring and extraction wells at this site, these waters must be treated to meet Federal and State Primary MCLs for VOCs, whichever is more stringent, prior to discharge to land. By meeting the Federal and State MCLs for VOCs before discharge, the remedy will satisfy the RCRA LDRs.

The container storage requirements in 22 CCR Sections 66264.170 -.178 are relevant and appropriate for the storage of contaminated groundwater over 90 days.

On-site storage or disposal of the spent carbon from the treatment system for more than ninety (90) days could trigger the State HWCA requirements for storage and disposal if the spent carbon contains sufficient quantities of hazardous constituents that cause the spent carbon to be classified as a characteristic hazardous waste. If the spent carbon is determined to be a hazardous waste under HWCA (Sections 66261 and 66262), the requirements for handling such waste set forth in Sections 66262 and 66268 are applicable.

10.4 Additional Matters

10.4.1 California Water Well Standards

Substantive standards for construction of public water supply wells have been published by the State as the California Water Well Standards. While these standards have not been specifically promulgated as an enforceable regulation and are therefore not ARARs, all groundwater facilities designed, located and constructed to produce drinking water must be constructed in accordance with these standards. Since the remedy involves delivery of the treated water to the public supply system, EPA has determined that the action shall comply with substantive Water Well Standards for construction of water supply wells, such as sealing the upper annular space to prevent surface contaminants from entering the water supply. Wells constructed solely for treatment and reinjection with no delivery to the public supply system would not be subject to these water well construction standards.

10.4.2 OSHA Requirements

Requirements of nonenvironmental laws, such as California OSHA regulations (8 CCR 5192) are not considered as ARARs and all such requirements applicable at the time of the activity would have to be satisfied.

11. THE SELECTED REMEDY

The remedial objectives of the Baldwin Park OU are to prevent future increases in, and begin to reduce, concentrations of trichloroethene, tetrachloroethene, carbon tetrachloride, and other VOCs in groundwater in the Baldwin Park area (hereafter referred to as contaminants or contaminated groundwater) by limiting further migration of contaminated groundwater into clean and less contaminated areas or depths that would benefit most from additional protection, and by removing contaminants from the aquifer.

An additional objective of this remedy is to collect and analyze groundwater quality, groundwater flow, and other data during operation of the remedy to determine final *in situ* clean up standards for the Baldwin Park area. Among the critical decisions to be made are the extent to which, and the timeframe in which, to address lower levels of contamination which may remain in the aquifer after construction and initial operation of the remedy. The final ROD will include *in situ* restoration standards, which may differ for different portions of the OU area, and may call for additional remedial actions in the area. EPA expects that this interim remedy will provide the basis for the final remedy for the Baldwin Park area.

At a minimum, EPA will formally evaluate the performance of the remedy every five years.

EPA's selected remedy includes the extraction rates and locations included in Alternative 1 and the option of distributing treated water to local purveyors (as described in Alternative 1) or to Metropolitan (as described in Alternatives 3 and 4). These components of the remedy are identical to the Proposed Plan. The extraction, treatment, water use, and monitoring components of the remedy are described further below. Also noted are project details that may change during the remedial design and construction processes (e.g., number and type of monitoring wells).

11.1 Extraction Locations

The selected remedy shall include extraction of contaminated groundwater at the downgradient end of two broad areas of contamination to limit contaminant migration and remove contaminant mass. The two areas are:

- **The Lower Area:** the portion of the aquifer in the vicinity of the San Bernardino Freeway (I-10), east of the San Gabriel River and west of Azusa Avenue (Highway 39), where concentrations of contaminants listed in Table ROD-1 or other VOCs are approximately 10 times Federal or State drinking water standards, and where downgradient portions of the aquifer are significantly less contaminated, between ND (non-detectable) and two times drinking water standards. Extraction wells shall be located to maximize protection of downgradient water supply wells. The areas are described by ranges of concentrations because actual concentrations vary month to month and year to year. *Approximate* boundaries of this area are shown in Figure ROD-10 as the Lower Area.

- **The Upper Area:** the portion of the aquifer north of Arrow Highway, immediately east of the Santa Fe Dam, containing a significant mass of *non-aqueous phase contamination* or other known or suspected surface or subsurface sources of contaminants listed in Table ROD-1 or other VOCs that are acting as continuing sources of dissolved-phase groundwater contamination. Available data indicate the presence of sources of contamination upgradient of wells W10WOMW1, V10VCMW1, V10VCMW2, OSCOMW2-5, Aerojet MW3-4, and W11AZW-03 and -09. Concentrations of PCE or TCE at most of these wells have exceeded 200 times drinking water standards. If additional investigation work indicates the presence of additional sources, the *pumping* configuration should be modified to the extent feasible to capture the additional sources. *Approximate* boundaries of this area are shown in Figure ROD-10 as the Upper Area.

EPA's analyses indicate that its remedial objectives can be efficiently met by extracting contaminated groundwater from the upper 400 - 500 feet of the aquifer; from three wells in the lower area and two wells in the upper area. Figure ROD-13 shows approximate extraction locations as well locations 13, 10, 5, 6, and 4. EPA recognizes that other pumping configurations, increasing the number of extraction wells but reducing rates, or decreasing the number of wells but increasing rates, may be equally efficient. If supplemental analyses demonstrate that alternative pumping configurations are equally efficient, they may be substituted for EPA's recommended locations. The phrase *pumping configuration* refers to precise extraction locations and rates within the upper and lower areas of contamination.

EPA believes that it is premature to select the number of wells or make a final decision on extraction locations at this time. Final decisions on extraction locations, and final decisions on whether existing wells in the vicinity of EPA's selected locations will satisfy these requirements, will be made during remedial design.

11.2 Extraction Rates

The selected remedy shall include extraction of contaminated groundwater at locations and rates sufficient to *capture* or *contain* particles (representing contaminants dissolved in the groundwater) moving from the upper and lower areas of contamination. Extraction shall result in *capture zones* that include the two subareas during all anticipated recharge conditions.[1] The *capture zones* shall also include all significant depth intervals where contaminant concentrations exceed MCLs for contaminants listed in Table ROD-1 or for other VOCs. The extraction system may be designed to allow contaminated groundwater to temporarily move past the extraction locations during periods of high recharge at the Santa Fe Spreading Grounds or elsewhere if the system can *recapture*, during subsequent periods of lower recharge, any contaminated groundwater that has moved beyond the extraction locations.

EPA's analyses indicate that its remedial objectives will be efficiently met by extracting 19,000 gpm of contaminated groundwater. EPA's analyses indicate that approximately 10,500 gpm of groundwater must be extracted more or less continuously in the lower area; approximately 8,500 gpm of groundwater must be extracted in the upper area. EPA's analyses indicate that these rates will intercept and capture contaminated groundwater during recharge and pumping conditions similar to those occurring between October 1977 and June 1990. During recharge conditions similar to the exceptionally rainy spring of 1983, contaminated groundwater may temporarily move beyond the extraction locations, but, in particle tracking simulations, appears to be subsequently recaptured.

If supplemental data and analyses justify modifications to EPA assumptions about the extent of contamination, hydraulic conductivity, regional flow gradients (which vary significantly depending on the amount and timing of precipitation and artificial recharge) or other factors that influence groundwater flow and contaminant transport, EPA will consider revised rates. EPA will also consider seasonally-variable rates that meet the requirements of this Section.

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[1]The amount and timing of precipitation and artificial recharge vary month to month and year to year, as do the resulting regional flow gradients.

Extraction shall occur as continuously as feasible. Feasibility may be temporarily limited by insufficient capacity to accept or distribute treated water by the recipient of the treated water, resulting from low customer demand (e.g., during rainy winter days) or competition for use of recharge areas.

11.3 Treatment

The extracted contaminated groundwater shall be treated to remove contaminants listed in Table ROD-1 and other VOCs by either or both of two proven treatment technologies: liquid-phase granular activated carbon (LGAC) filtration and *air stripping*. The treated groundwater exiting the treatment facilities shall meet Federal and State primary MCLs for contaminants listed in Table ROD-1 and for other VOCs. In addition, the treated groundwater shall meet proposed Federal secondary MCLs for ethylbenzene and toluene. If *air stripping* is used, offgas controls (e.g., *vapor phase granular activated carbon*) shall be used to reduce air emissions in accordance with ARARs promulgated by the South Coast Air Quality Management District. EPA believes that if properly designed, these proven treatment technologies (LGAC and *air stripping*) are equally effective at removing VOCs for most mixes of contaminants. One technology may be used at one location and the other at a different location, or both technologies may be used in a *treatment train* at a single location.

Existing treatment facilities (e.g., planned treatment at Valley County Water District's Big Dalton well) may be incorporated into the remedy if, during remedial design, agreements can be reached for their use and they meet other requirements of this Record of Decision. The San Gabriel Basin Water Quality Authority (the project's sponsor) expects construction to be completed in late 1994. One or more new treatment facilities shall be constructed to provide the remaining treatment capacity.

An Advanced Oxidation Process may be used for pretreatment in combination with LGAC treatment if proven to be effective and economical during design phase testing and analysis. The VOC treatment technology or combination of technologies which best meet the objectives of the remedy for the Baldwin Park OU will be determined during the remedial design phase, when more detailed and up to date information will be available to assess effectiveness and cost. Final decisions on the locations of the treatment facilities will also be made during remedial design.

11.4 Water Distribution and Use

The selected remedy shall include pipelines, pump stations, and other conveyance facilities needed to transport the treated groundwater to one or more delivery locations. If treated water is supplied to one or more water purveyors, the delivery location or locations shall be at a pipeline, storage reservoir, or other portion of the purveyors' distribution systems. The purveyors would be responsible for distributing the water to their residential and business customers through their existing distribution systems. The selected remedy may also include improvements to the recipient's existing distribution system if the improvements are needed to allow the recipient to accept treated groundwater at extraction rates required by Section 11.2 of this ROD.

EPA's preference is that treated water be delivered to water purveyors. The advantages of supplying water to purveyors, rather than recharge, are: reduced pumping costs; the lower risk of inadequate distribution during and after rainy months; and purveyors downgradient of Subarea 3 could reduce extraction at existing water supply wells located outside of the highly contaminated areas that may be pulling contaminated groundwater into less contaminated areas or depths.

Initial discussions with water purveyors indicate that purveyors in best position to accept treated water are San Gabriel Valley Water Company, Suburban Water Systems, Covina Irrigating Company (CIC), the cities of Azusa and Glendora, and Metropolitan. CIC and Metropolitan are wholesalers of water that would in turn supply retail water companies; the other four companies supply businesses and residents directly. CIC's potential customers include the City of Covina, the City of West Covina, Suburban Water Systems, and others. Metropolitan's customers include a large number of water agencies both within and outside of the San Gabriel Valley.

EPA would actively support supplying treated water to Metropolitan if it would decrease the cost of the project and reduce institutional barriers. Supplying water to Metropolitan would provide water users throughout Southern California with a new source of water during peak demand periods, and probably benefit from Metropolitan expertise in building and operating large water supply projects. If Metropolitan receives treated water, they would probably play a significant role in the design, construction, and/or operation of the remedy to ensure that the project meets their water supply requirements. Metropolitan has reportedly budgeted $25 million for a *conjunctive* use project in the San Gabriel Basin.

EPA believes that it is premature to specify any one or a combination of recipients of the treated water. The final decision will be made after completion of the ROD depending on the outcome of additional negotiations with potential recipients of the treated water to identify recipients that can be supplied at least cost with the fewest institutional obstacles. Arrangements must be made with recipients to address EPA and purveyor financial obligations (see footnote, page 60); responsibility for design, construction, operation, and maintenance; timing and dependability of the supplied water; water rights issues; and other issues.

The potential for funding through the Reclamation Projects Authorization and Adjustment Act of 1992 (P.L. 102-575) will also be considered. The Act authorizes Federal funding of up to 25% for "the design, planning and construction of a conjunctive-use facility designed to improve the water quality in the San Gabriel groundwater basin and allow the utilization of the basin as a water storage facility."

If water purveyors can accept water for most, but not all, of the year, excess water shall be delivered to a location or locations from which it can flow into spreading basins and flood control channels operated by the Los Angeles County Department of Public Works for recharge into the aquifer. If agreements cannot be reached with San Gabriel Basin water purveyors, water shall be recharged year-round. If recharge is necessary, recharge location(s) will be determined during remedial design. If treated water is recharged, the State anti-degradation requirement is an additional ARAR that may influence the level of treatment. If treated water is recharged, the remedy may include activities to maintain or improve the infiltration capacity of the spreading grounds, or to acquire or develop new recharge facilities. If treated water is discharged to a surface water, the discharge shall meet NPDES requirements.

11.5 Monitoring Program

The remedy shall include the installation and sampling of groundwater monitoring wells, the sampling of existing monitoring wells, measurement of groundwater elevations at monitoring and production wells, and the measurement of other aquifer properties to:

- Verify or refine the boundaries of upper and lower areas to help determine final pumping configurations.
- Verify or refine the efficiency of EPA's recommended pumping configurations.

- Verify or revise contaminant influent concentration estimates that will be used in the design of the OU treatment facilities.

- Provide an early warning network so that changes in the groundwater flow regime or contaminant concentrations that may require modifications in extraction rates, well locations, or treatment methods are identified in time to institute the necessary facility and operational changes.

- Evaluate the presence and approximate location of non-aqueous phase contamination or other subsurface sources of groundwater contamination to supplement site assessments of individual facilities or properties.

- Evaluate the effectiveness of the remedy in satisfying the remedial objectives of limiting the vertical and lateral migration of contaminated groundwater and removing contaminant mass in and downgradient of the upper and lower areas. The evaluation may include plotting and interpretation of temporal trends in water quality, analysis of changes in groundwater flow induced by the extraction wells, and computer simulations of groundwater flow, including the estimation and evaluation of *capture zones*.

- Help determine the need for additional remedial actions in the Baldwin Park area and the nature of the final remedy (e.g., the extent to which and timeframe in which aquifer restoration is feasible). Satisfying this objective may include lab or field testing to estimate parameters that govern sorption, biogical degradation, or other processes that affect contaminant transport in the aquifer (e.g., concentrations of total organic carbon, dissolved oxygen or other gases, nutrients, indigenous microbial populations).

Satisfying one or more of the monitoring objectives may also require ancillary data, including information on pumping and recharge rates and volumes, lithology, measurements of hydraulic conductivity, and measurements of other aquifer properties. These data are needed to allow for accurate determinations of the direction and magnitude of horizontal and vertical flow in the vicinity of the remedial action; discern significant temporal variation in flow gradients; and simulate the effects of recharge and pumping on groundwater flow. These data are also needed to refine the understanding of the geology in the Baldwin Park area, including the occurrence and extent of highly permeable or fine-grained deposits which could affect groundwater flow paths.

Groundwater monitoring shall begin during the time of remedial design to provide data necessary to complete the final design and to establish pre-implementation, *baseline* conditions. Initially, collection and analysis of groundwater quality samples shall occur no less frequently than bimonthly for VOCs and quarterly for other parameters (except for less frequent depth-specific sampling of extraction wells). Initially, measurement of water levels shall occur no less frequently than monthly. Monitoring frequency may decrease if EPA determines that conditions warrant such a decrease. Frequency may vary by parameter. Water quality parameters to be quantified will include VOCs, semivolatile organic compounds, general minerals, nitrate (NO_3), radon, and physical parameters required for treatment purposes (e.g., color, turbidity, and odor).

EPA's preliminary recommendations, which rely as much as possible on existing wells, are to include the following numbers and types of wells in the monitoring program:

- Water quality and water level data at twenty-four existing inactive and active production wells, including two existing wells that may be used as extraction wells. Some of these wells are currently sampled as part of the Title 22 monitoring program, but it may be necessary to increase the number and frequency of parameters analyzed;

- Water quality and water level data at five existing *standard* monitoring wells and one existing MP monitoring well, which include the Baldwin Park Key Well and the U.S. Environmental Protection Agency's deep multiple port (MP) monitoring well (MW5-1). Also, continued sampling of selected facility site assessment wells. Although most site assessment wells penetrate a relatively small portion of the saturated zone, their location upgradient of likely extraction well clusters make selected wells favorable monitoring points for assessing future water quality at the clusters;

- Water quality and water level data at two new MP monitoring wells (or equivalent conventional well clusters);

- Water quality and water level data at two new two-well monitoring well clusters (These wells were added in response to public comments on the FS and Proposed Plan - See Part III of this ROD.);

- Water quality and water level data at eight new three-well monitoring well clusters (One three-well cluster was added in response to public comments on the FS and Proposed Plan - see Part III of this ROD.);

- Three new piezometer clusters, each containing three wells (one set near each extraction well in Subarea 3) to provide more detailed data on water level changes near the extraction wells and evaluate the effective capture zone of the extraction wells; and

- Wellhead water quality data, depth-specific water quality data, spinner logging, and water level data at or adjacent to the five new extraction wells[2] - to evaluate the effectiveness of contaminant removal.

Locations and construction information on existing production and monitoring wells are shown in Table ROD-7 and Figure ROD-14. The purpose and location of the new wells are described in Table ROD-8 and Figure ROD-14. The depth and number of sampling zones are based, in part, on estimates of the vertical extent of groundwater contamination.

Additional monitoring wells or piezometers shall be installed to replace existing wells if significant vertical gradients complicate the interpretation of water level data collected from production wells; or if existing wells currently planned for inclusion in the program are abandoned.

Locations shown in Figure ROD-14 may be revised, or locations added or eliminated, if extraction locations change, if EPA's interpretation of the lateral or vertical extent of contamination changes, if influent concentrations to the treatment facilities vary unexpectedly (requiring installing additional wells to evaluate the magnitude and cause of the observed deviation); if source investigations identify previously unknown sources requiring characterization; or if individual facility or property owners install new wells that should be included in the monitoring program.

The remedy shall also include sampling of influent and effluent water quality, into and exiting the treatment facilities, and other collection and analysis of interpretive data needed to meet the monitoring objectives outlined in this section. EPA also recommends one-time geophysical logging of new-well pilot holes and aquifer testing at new wells to provide information on aquifer parameters and characteristics.

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[2] A cost-effective means of obtaining this data is to install a permanent access pipe in at least one well at each extraction well cluster. This allows for spinner logging and collection of depth-specific water samples during operation.

11.6 Project Costs

The following two tables present estimates of the capital costs, and operation and maintenance costs, for the remedy. The estimated construction cost subtotal, which includes the extraction, treatment, conveyance, and monitoring hardware, is $25 million[3]. An additional $22 million is added to account for engineering design, construction services, legal and administrative costs, contingencies, and land acquisition. The majority of the estimated construction costs of the remedy (more than 75%) are associated with the treatment and conveyance components. The majority of the estimated operating costs of the remedy is for the purchase of electricity and carbon.

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[3] This estimate does not include the costs of the three monitoring well clusters added to the remedy in response to public comments. The estimated capital cost of the three wells is less than $0.4 million; the estimated operating cost is less than $0.1 million.

Capital Costs Estimates for the Selected Remedy, Baldwin Park OU	Millions of Dollars
Extraction System: New Groundwater Extraction Wells and Monitoring Wells	4.1[3]
Treatment System for VOC Removal	10.7
Conveyance System: Pipelines, Pump Stations, and Other Conveyance System Hardware	8.5
Other Construction Costs	1.6
"Bid and Scope" Contingencies (estimated at 35% of extraction, treatment, conveyance, and other construction costs)	8.8
Construction Services (estimated at 10% of extraction, treatment, conveyance, other construction, and contingency costs)	3.4
Land Acquisition	1.5
Engineering Design, Legal, and Administrative Costs (estimated at 22% of extraction, treatment, conveyance, other construction, contingency, and land acquisition costs)	8.5
TOTAL CAPITAL COSTS:	47.1[3]

Operation and Maintenance Cost Estimate for the Selected Remedy, Baldwin Park OU	Annual Costs (millions of dollars)
Electrical Costs for Extraction Wells	1.5
Electrical Costs for Pump Stations	0.7
Electrical Costs for Treatment System	0.4
Carbon Replacement	0.9
Other Treatment Plant Costs	0.8
Monitoring Well Sampling	0.7[3]
Maintenance (estimated as 2% of capital cost estimate)	0.7
Purveyor Reimbursement Costs (estimated at $50/acre-foot)[4]	*- 1.5*
TOTAL OPERATION AND MAINTENANCE COSTS:	4.2[3]

The net present value of the remedy, assuming 30 years of operation, a discount rate of 7%, and purveyor reimbursement of $50/acre-foot, is $99.7 million[3].

Three major assumptions made in developing the cost estimates are described below.

> **Availability of Existing Wells:** The cost estimate assumes that two inactive existing water supply wells in the OU area, owned by local purveyors, can be used as part of the remedy. If additional existing wells are used, costs would decrease slightly. If, instead, new wells must be constructed, capital costs would increase slightly.

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[4] EPA expects that water purveyors that accepted and distributed treated water would contribute to project operating costs to offset any savings resulting from not using other sources of water. These *avoided costs* range from $30 per acre-foot for purveyors that pump clean groundwater to more than $300 per acre-foot for purchases of imported water. One acre-foot equals 325,829 gallons.

Estimated Contaminant Concentrations: If actual contaminant concentrations differ from the estimated concentrations, or if new contaminants are detected, operating costs will change. If the deviations are large, capital modifications may be necessary. The largest impact would be if increasing nitrate (NO_3) concentrations in the groundwater make installation of NO_3 treatment necessary. The cost of NO_3 treatment is not included because of limitations in EPA's ability to predict the timing and magnitude of future increases in NO_3 concentration in groundwater, and uncertainty about NO_3 treatment requirements of the recipients of the treated water.

Availability of Existing Treatment Facilities: The cost estimate assumes that new treatment facilities, with a capacity of 19,000 gpm, must be built. One or more planned or existing treatment facilities may be available and offset the need for new treatment capacity, reducing the capital costs of new treatment facilities.

12. STATUTORY DETERMINATIONS

As required under Section 121 of CERCLA, the selected interim remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the interim remedial action, and is cost effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment to reduce toxicity, mobility, and volume as a principal element.

12.1 Protection of Human Health and the Environment

The selected remedy will protect human health and the environment by limiting further downgradient and vertical migration of contaminated groundwater and removing significant contaminant mass from the aquifer. The remedy will reduce potential risks by decreasing the likelihood and magnitude of future exposure to contaminated groundwater. Contaminant concentrations in the groundwater in the areas to be addressed by the remedy are currently tens to thousands of times acceptable levels. The selected treatment technologies are technically feasible and proven effective at meeting ARARs for VOCs in the treated groundwater and air. Implementation of the remedy will not pose unacceptable short-term risks. In addition, no adverse cross-media impacts are expected.

12.2 Compliance with ARARs

The selected remedy shall comply with all ARARs, which are listed in Section 10 of this ROD. No ARARs waivers are expected to be needed. Because the selected remedy is an interim remedy, it may not achieve final cleanup levels for the groundwater and no chemical-specific ARARs for aquifer cleanup are included. In Alternatives 1-4, chemical-specific ARARs for the treated water from the VOC treatment plant are Federal MCLs and more stringent State MCLs for VOCs.

12.3 Cost-Effectiveness and Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA believes that the selected remedy is cost-effective and utilizes permanent solutions and treatment technologies to the maximum extent practicable *for an interim remedy*. The selected remedy will reduce the mobility of the contaminants in two critical portions of the aquifer and will permanently reduce the volume of contamination by limiting the spread of the contamination and removing contaminant mass. The likelihood that the remedy will operate for as many years as needed will be increased if, as recommended, the treated water becomes a dependable source of potable water. If the treated groundwater becomes a dependable source of potable water, it would provide an incentive for recipients of the treated water to support the project's continued operation. The remedy calls for the construction of conveyance systems and negotiation of agreements needed to supply treated water to water purveyors for distribution to their customers.

Extraction of contaminated groundwater in a third portion of the aquifer would increase the effectiveness of the remedy and reduce the mobility and volume of contaminants by further limiting migration within the area of contamination and removing additional contaminant mass. Costs would increase, however, by approximately 50%. (The area of contamination addressed in the Baldwin Park OU is large, making it infeasible to limit migration throughout the entire area of contamination. Any realistic remedy must select the area or areas of contamination that would benefit most from additional protection.) EPA does not believe that the incremental benefits of groundwater extraction in a third subarea warrant the additional costs at present, given that the selected remedy is an interim remedy. Adding a third area may also decrease the implementability of the remedy due to the need to distribute 50% more treated water, possibly delaying implementation of the project. Implementability issues include the need to reach agreements with additional parties that would receive treated water from an OU, resolution of water rights issues, and acquisition of additional property and/or easements for the construction of extraction wells, treatment facilities, and conveyance facilities.

EPA evaluated comments from the State, which concurred with EPA's proposed remedy, and comments from the community, which are mixed in their recommendations. The community offered comments on a variety of topics, including the size of the remedy and the disposition of the treated water. Some commenters recommended a larger remedy; others recommended a smaller remedy. The more than 400 public comments received during the public comment period, along with EPA's responses, are presented in Part III of this ROD.

The most significant factors in the selection of the remedy are the interim status of the remedy, uncertainty about the cost-effectiveness of the alternatives not selected, and implementability. The Superfund evaluation criteria that were the most important in selecting the remedy were long-term effectiveness; reduction of toxicity, mobility, or volume; implementability; and cost.

12.4 Preference for Treatment as a Principal Element

This interim remedy will use treatment (*air stripping* and/or LGAC) to address the principal threat posed by the site: exposure to contaminated groundwater. Future actions may be needed, however, to completely reduce the threat to acceptable levels.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, EPA shall conduct a review, pursuant to CERCLA Section 121, 42 U.S.C. Section 9621, at least once every five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

13. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan was released for public comment in May 1993. The Proposed Plan called for groundwater extraction and treatment in the upper and lower areas (as identified in Alternative 1). The Proposed Plan differed from the description of Alternative 1 in the FS in one aspect: it identified local water purveyors and Metropolitan as potential recipients of the treated water. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, were necessary.

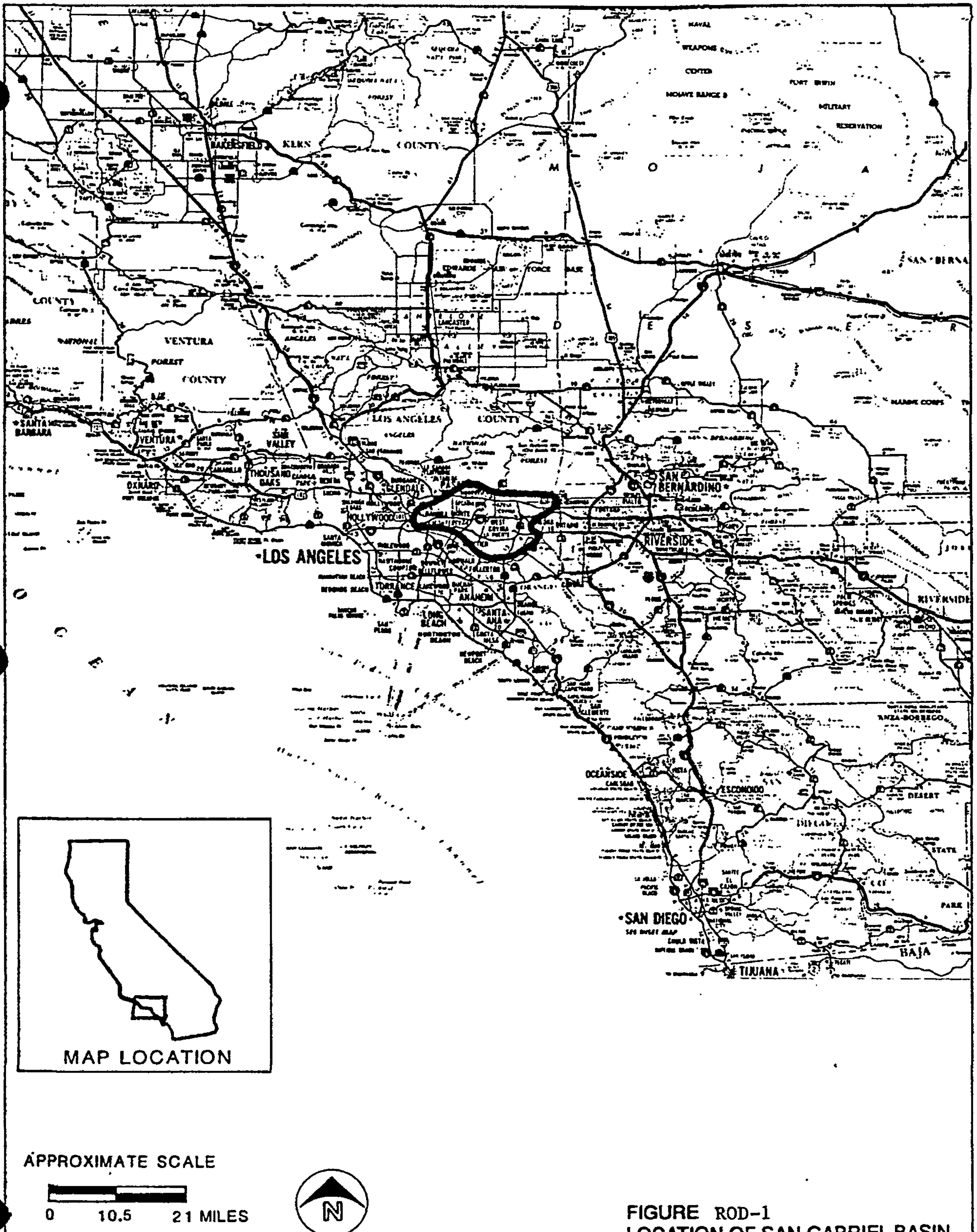


FIGURE ROD-1
LOCATION OF SAN GABRIEL BASIN
BALDWIN PARK OPERABLE UNIT

SAN GABRIEL BASIN

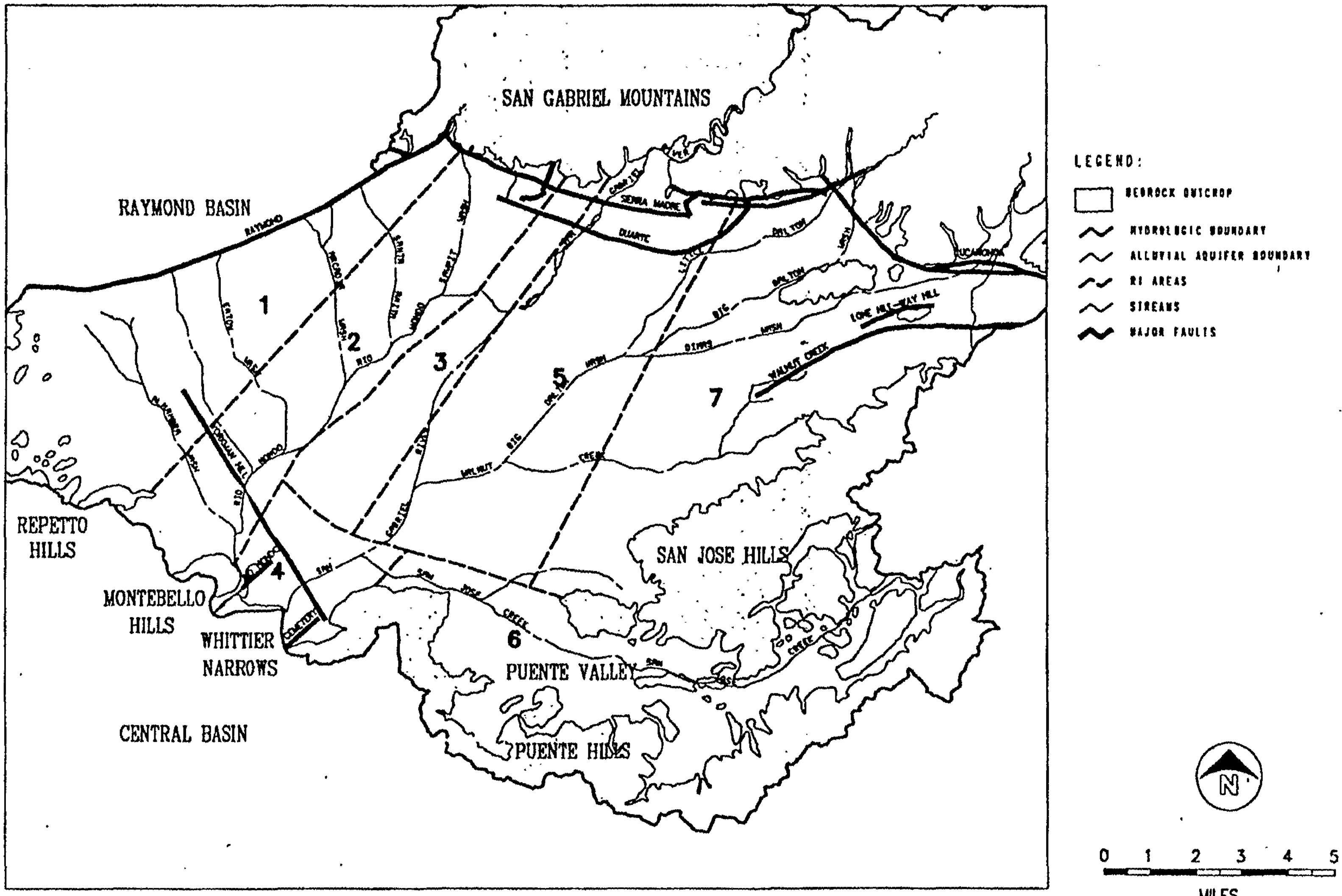


FIGURE ROD-2

HYDROGEOLOGIC FEATURES IN THE SAN GABRIEL BASIN

BALDWIN PARK OPERABLE UNIT

San Gabriel Basin

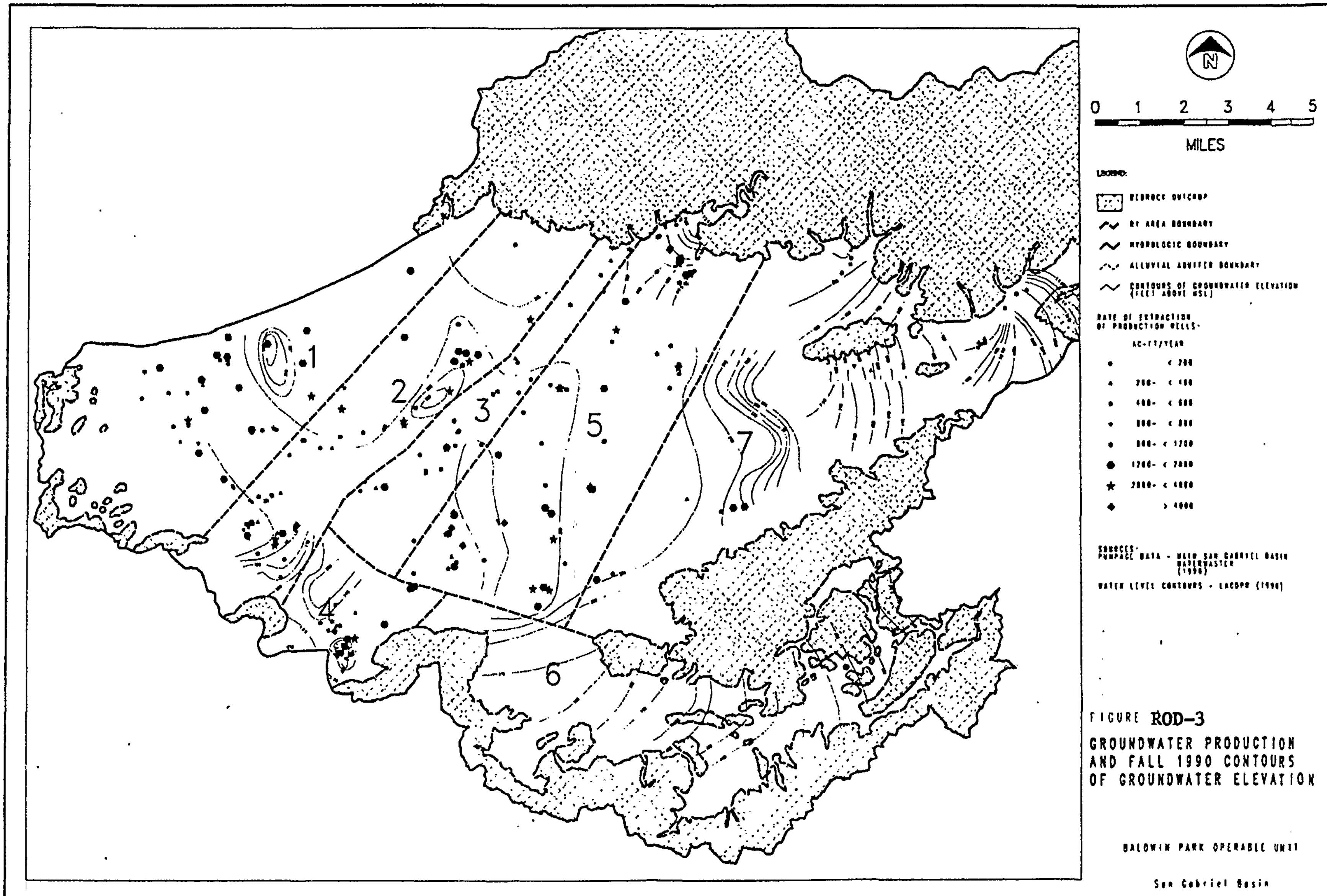


FIGURE ROD-3

GROUNDWATER PRODUCTION AND FALL 1990 CONTOURS OF GROUNDWATER ELEVATION

BALDWIN PARK OPERABLE UNIT

San Gabriel Basin

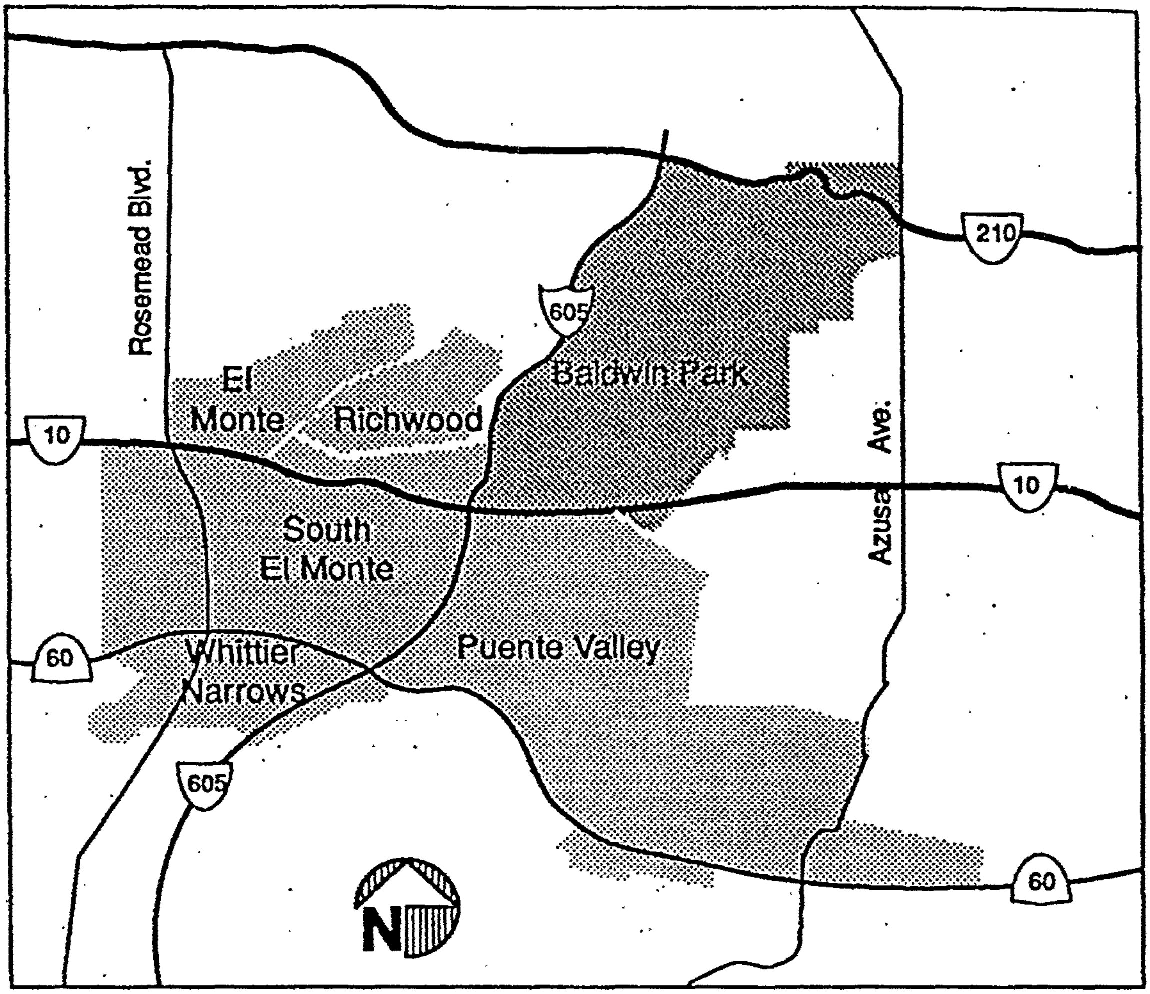
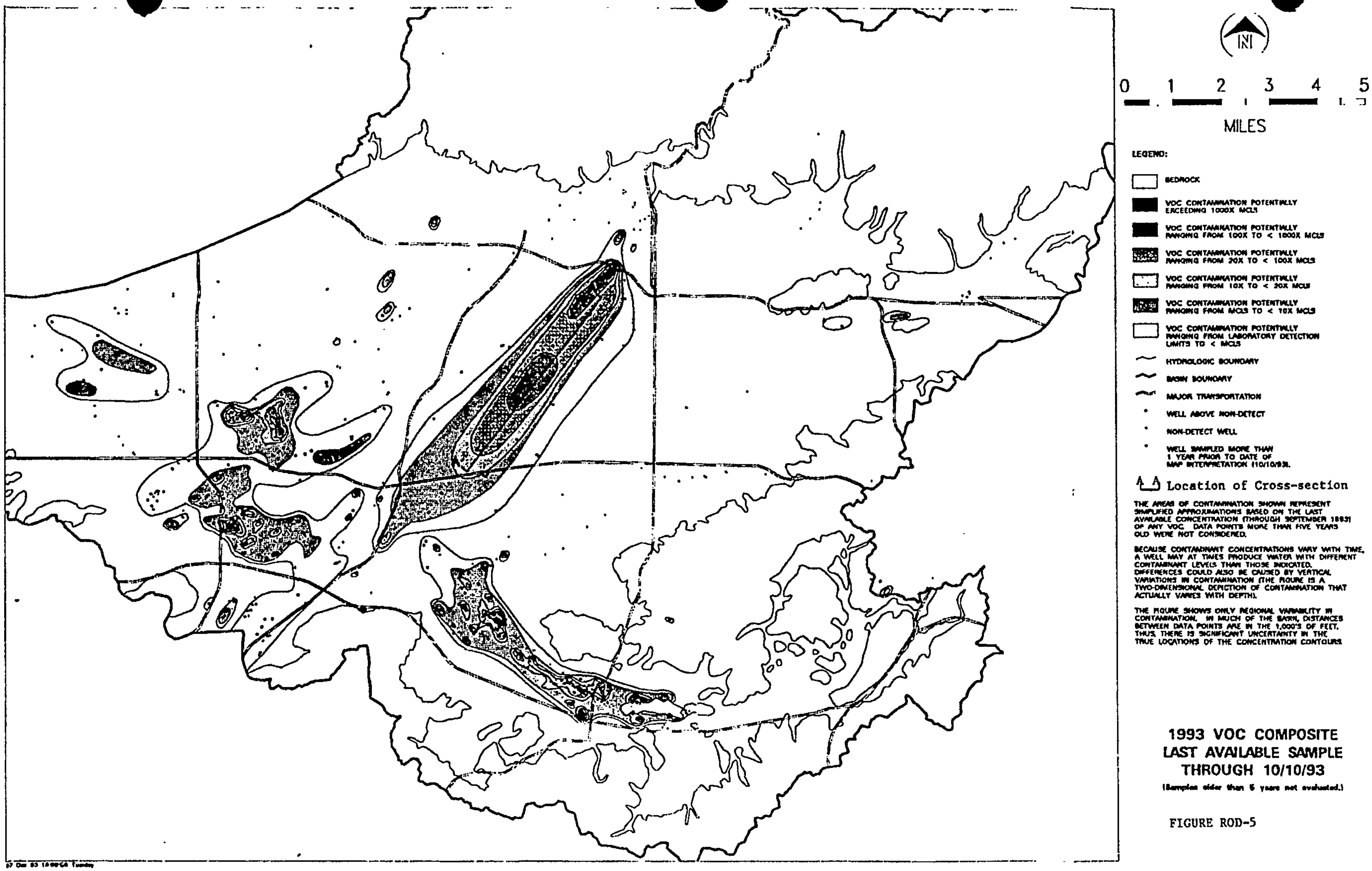


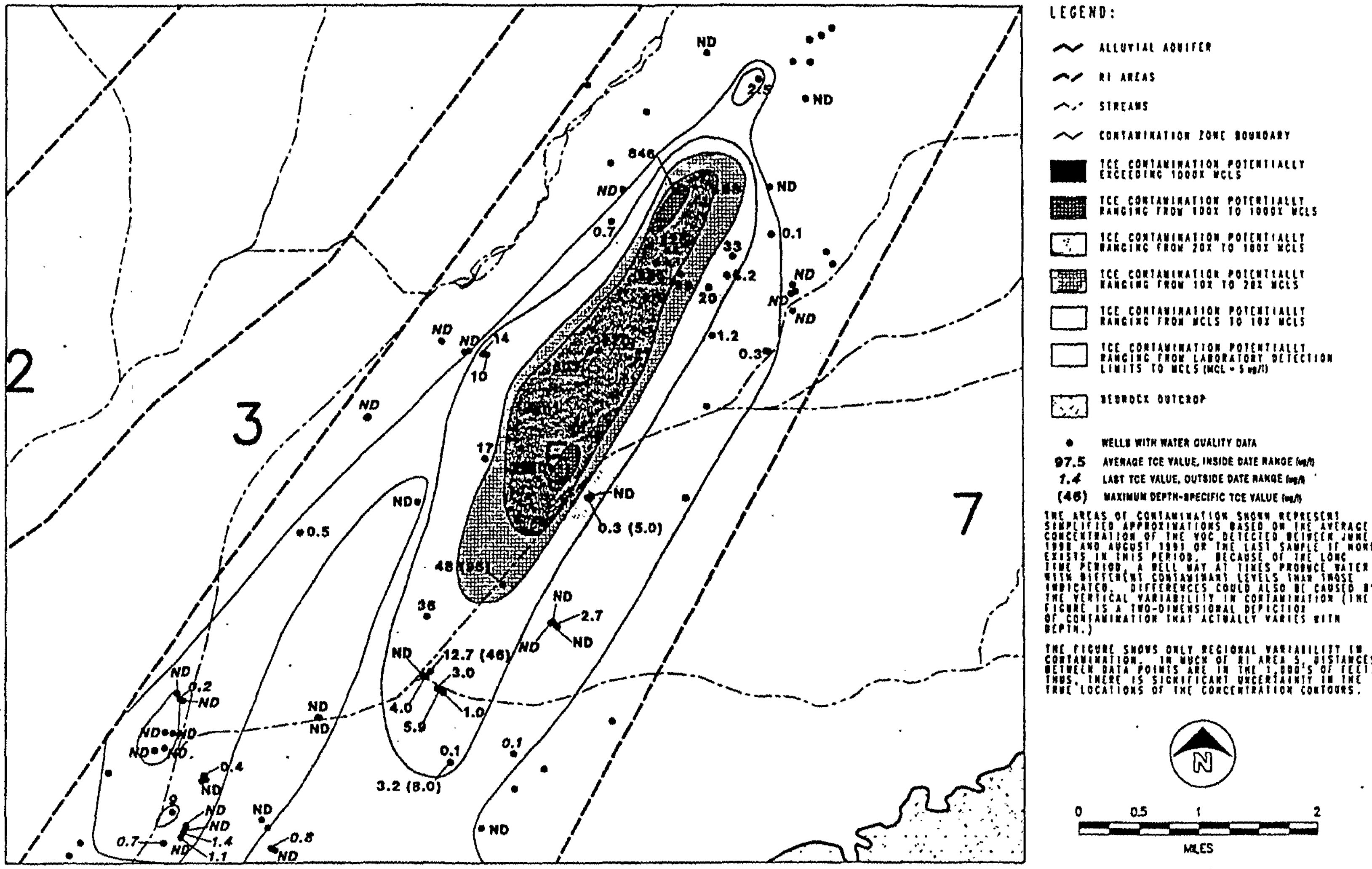
Figure ROD-4 SAN GABRIEL VALLEY STUDY AREAS



1993 VOC COMPOSITE
LAST AVAILABLE SAMPLE
THROUGH 10/10/93

(Samples older than 5 years not evaluated.)

FIGURE ROD-5



ESTIMATED EXTENT OF TCE CONTAMINATION IN THE OU AREA

FIGURE ROD-6

BALDWIN PARK OPERABLE UNIT

San Gabriel Basin

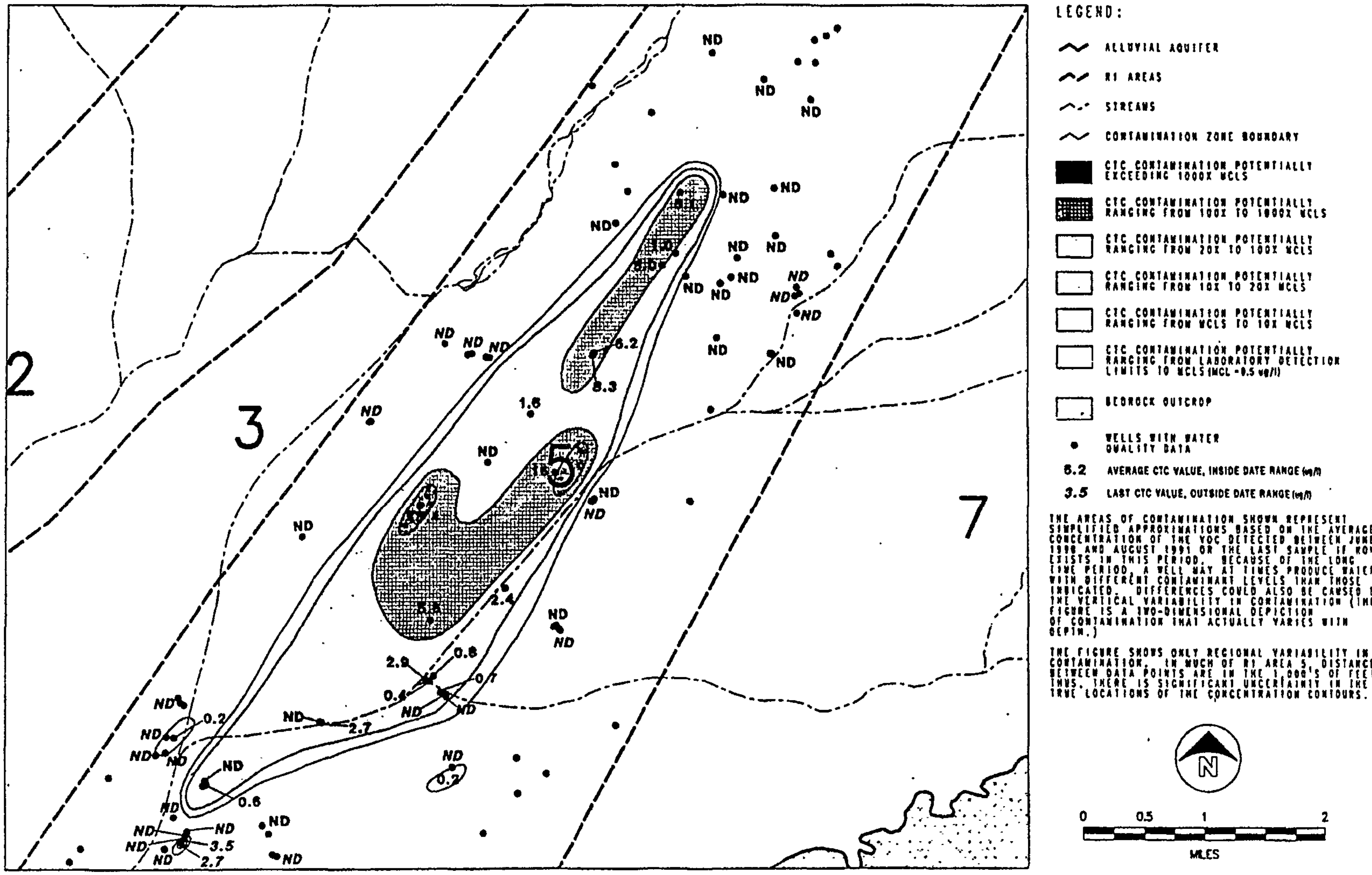


FIGURE ROD-7

BALDWIN PARK OPERABLE UNIT

San Gabriel Basin

ESTIMATED EXTENT OF CTC CONTAMINATION IN THE OU AREA

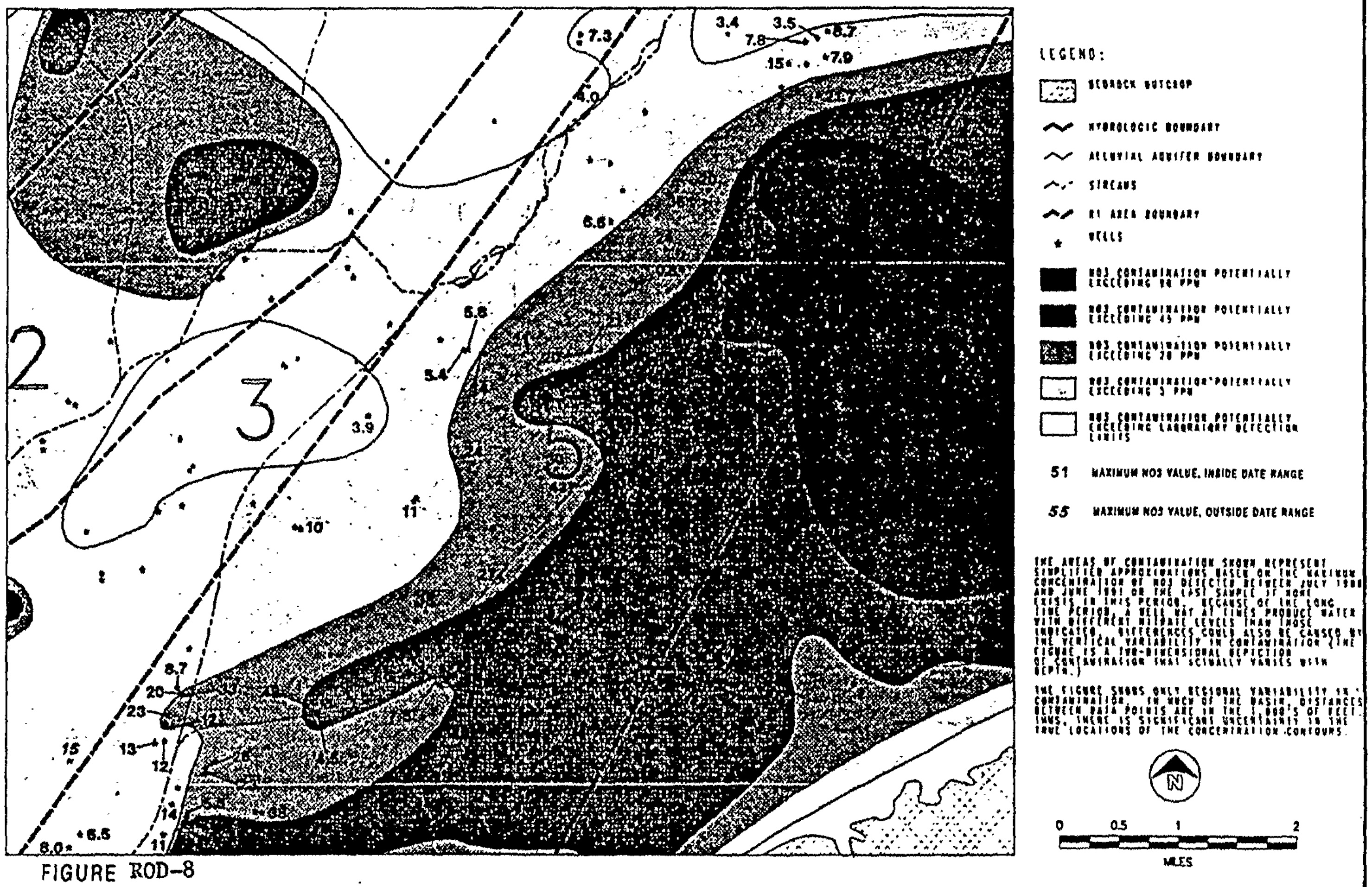


FIGURE ROD-8

ESTIMATED EXTENT OF NITRATE CONTAMINATION IN THE OU AREA

BALDWIN PARK OPERABLE UNIT

San Gabriel Basin

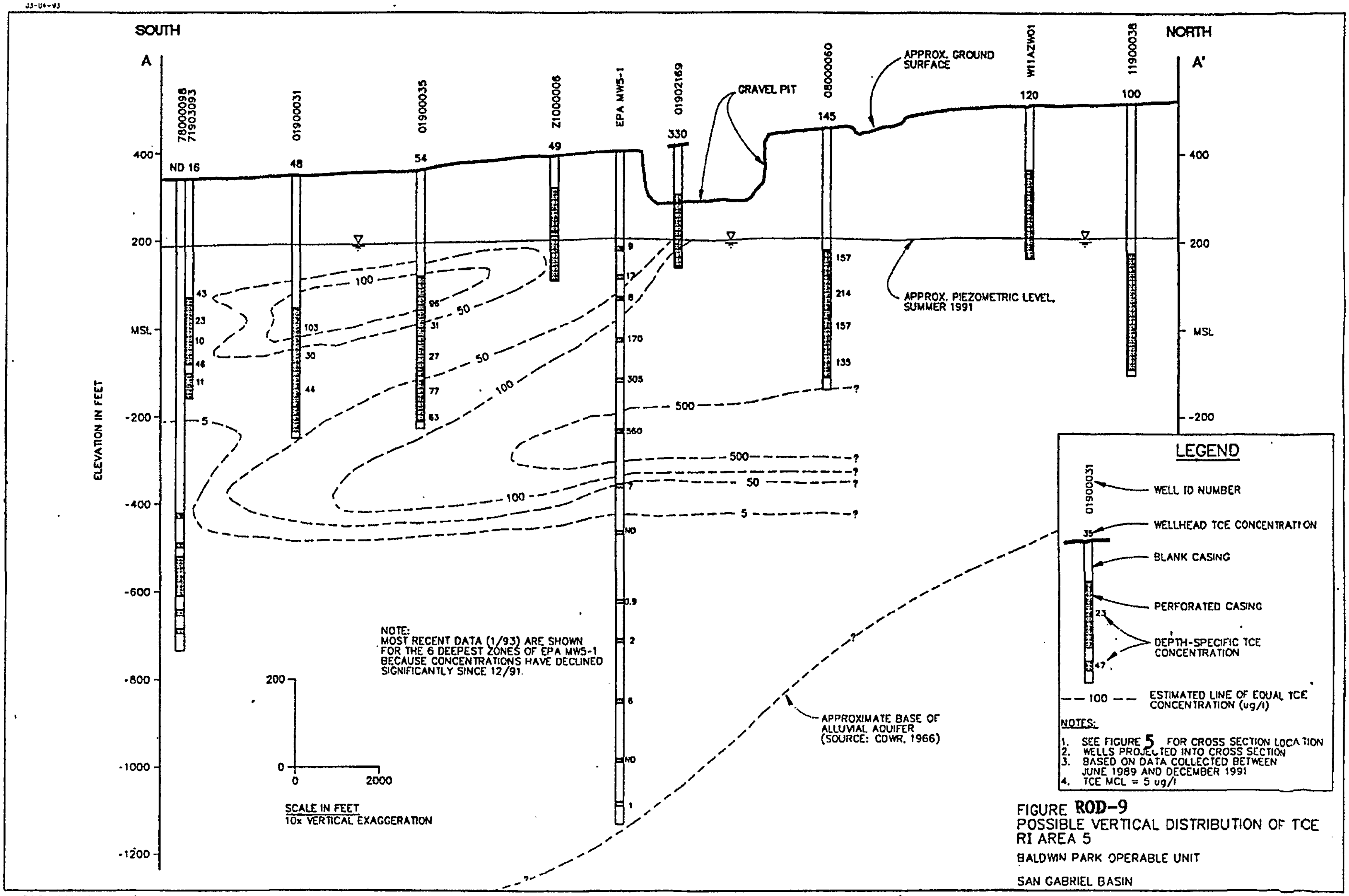


FIGURE ROD-9
POSSIBLE VERTICAL DISTRIBUTION OF TCE
RI AREA 5
BALDWIN PARK OPERABLE UNIT
SAN GABRIEL BASIN

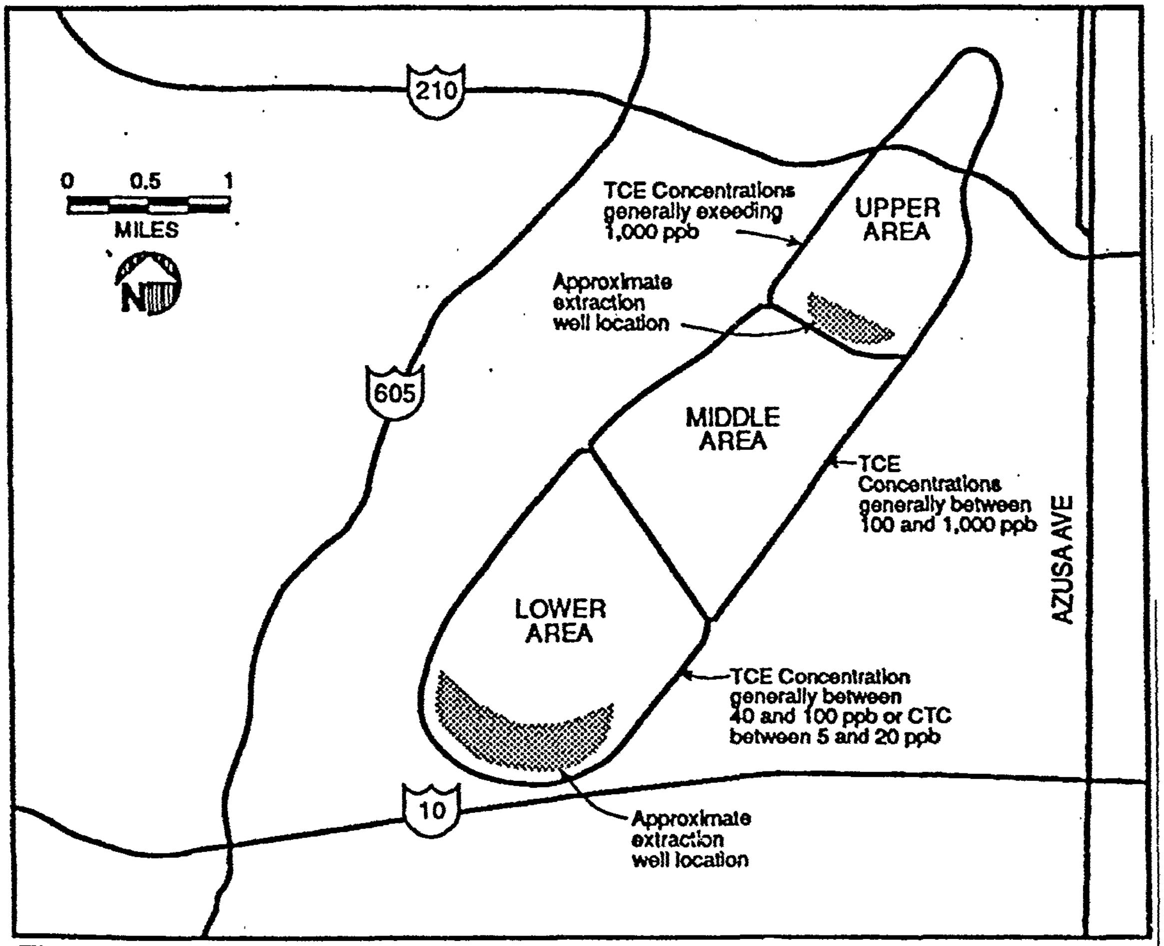


Figure ROD-10 Approximate Extraction Well location

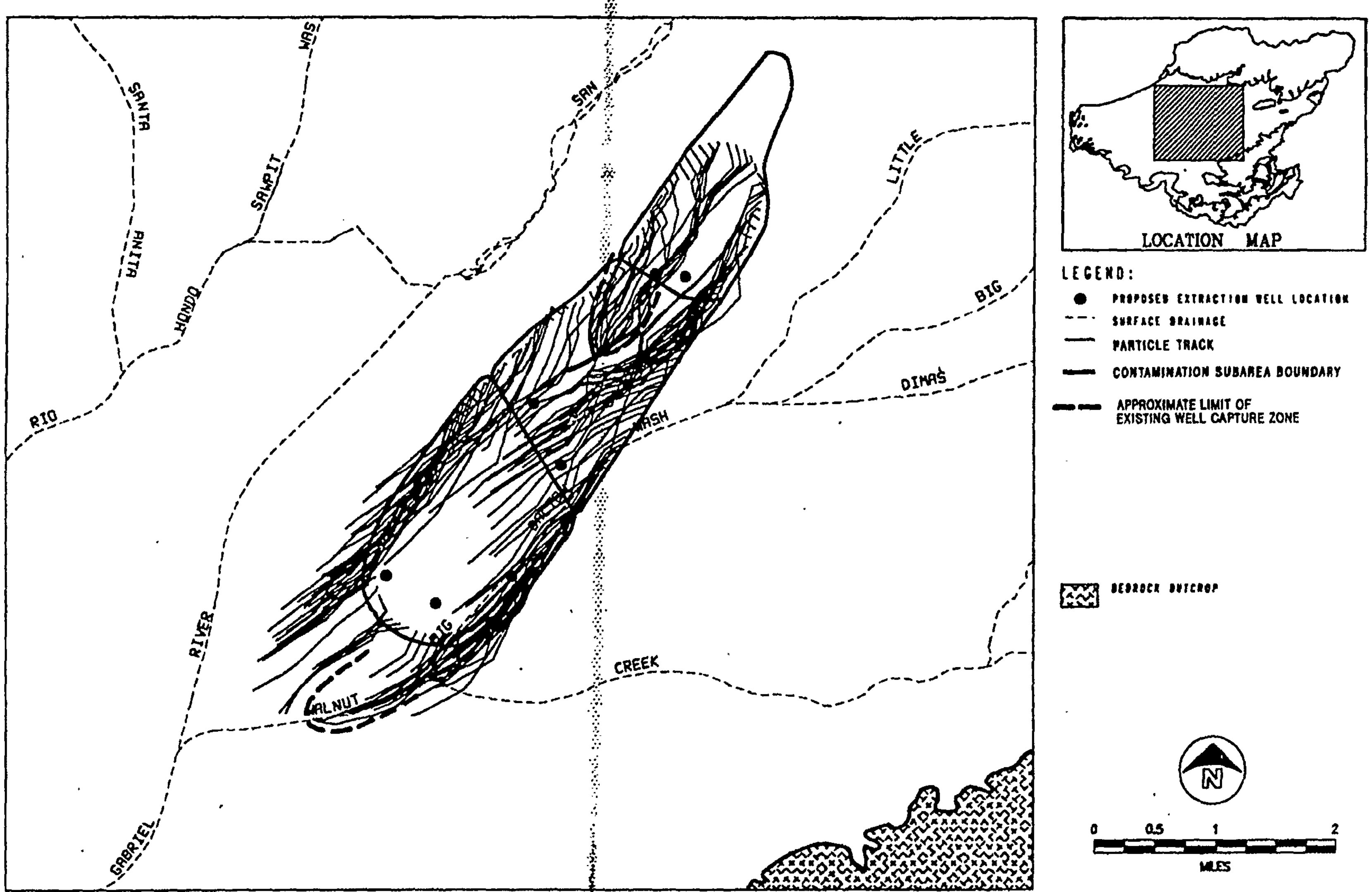


FIGURE ROD-11

PARTICLE TRACKING RESULTS - BASE CASE (NO-ACTION ALTERNATIVE)

BALDWIN PARK OPERABLE UNIT.

San Gabriel Basin

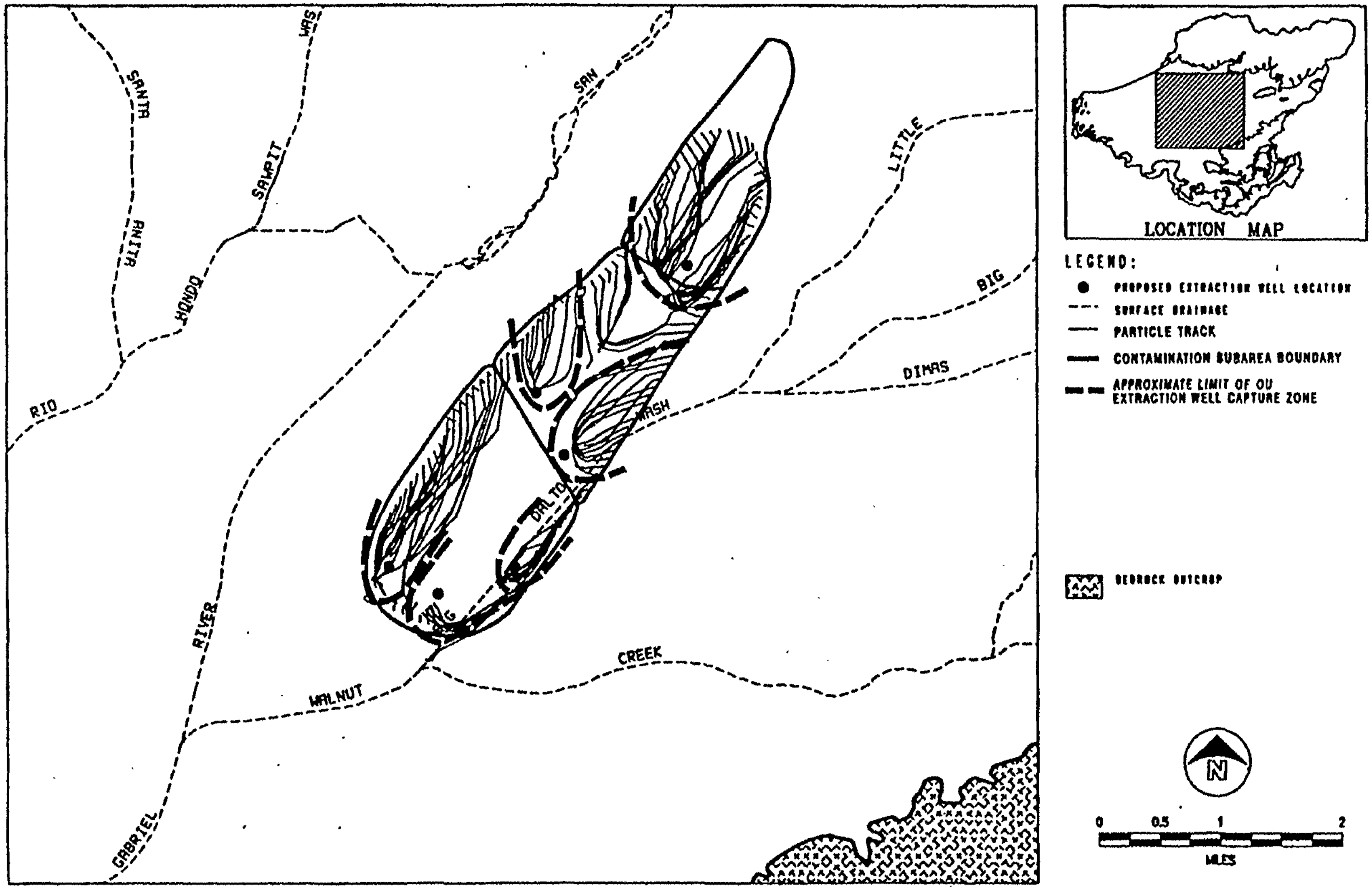
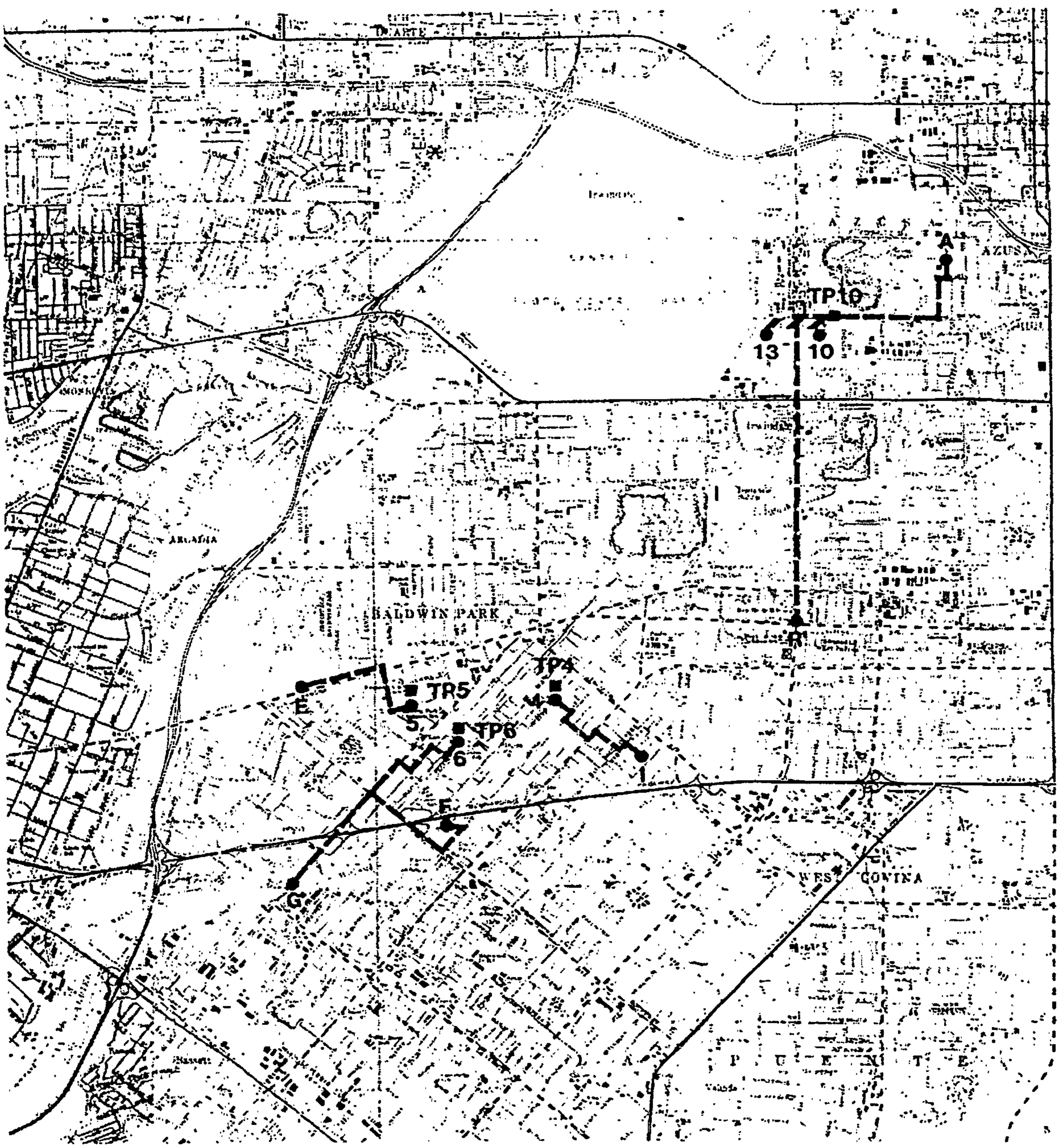


FIGURE ROD-12

PARTICLE TRACKING RESULTS - 29,000 GPM (MODIFIED) SCENARIO

BALDWIN PARK OPERABLE UNIT

San Gabriel Basin



LEGEND

- RAW WATER PIPELINE
- TREATED WATER PIPELINE
- ● E PURVEYOR CONNECTION POINT
- ● 4 EXTRACTION WELL CLUSTER
- ■ TP4 TREATMENT PLANT LOCATION

N

0 2500 5000

SCALE IN FEET

FIGURE ROD-13

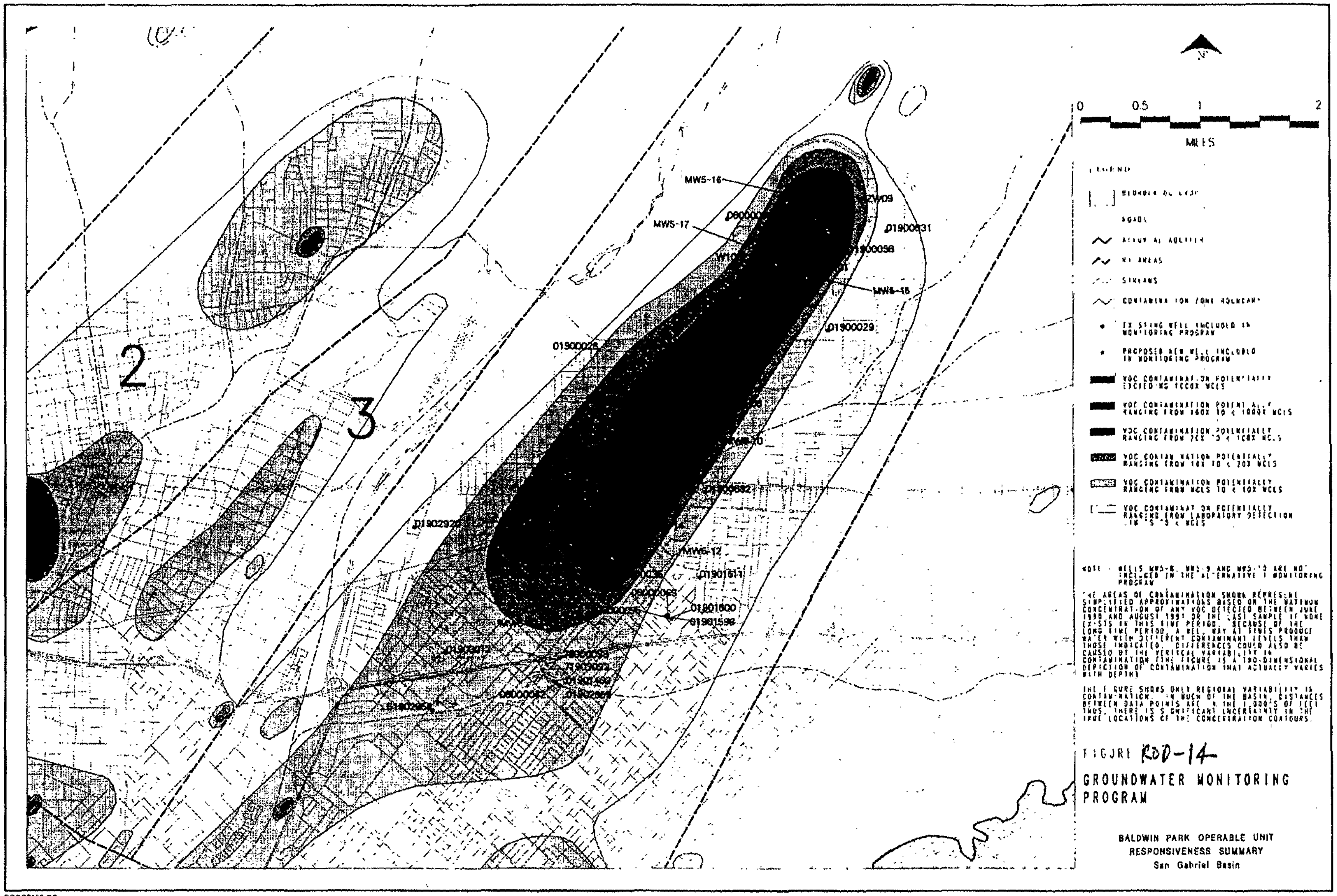


FIGURE RDD-14

GROUNDWATER MONITORING PROGRAM

BALDWIN PARK OPERABLE UNIT
RESPONSIVENESS SUMMARY
San Gabriel Basin

SCO59118.R6

Table ROD-1 Partial List of Contaminants Detected in Groundwater in the Baldwin Park area

Contaminant
Trichloroethylene (TCE)
1,1-Dichloroethane (1,1-DCA)
1,1-Dichloroethene (1,1-DCE)
cis-1,2-Dichloroethene
trans-1,2-Dichloroethene
1,2-Dichloroethane (1,2-DCA)
Acetone
Methylene Chloride
Vinyl Chloride
Trichlorofluoromethane (TCFM)
Tetrachloroethene (PCE)
Carbon Tetrachloride (CTC)
1,1,1-Trichloroethane (1,1,1-TCA)
Benzene
Toluene
Bromodichloromethane (BDCM)
Chloroform
Chlorobenzene
1,1,1,2-Tetrachloroethane
1,2,3-Trichloropropane
Freon 113
1,2-Dibromoethane

Table ROD-2
Chemicals of Potential Concern in Groundwater

Chemical	#Detect/ #Sampled[1]	Concentration[2] (µg/l)			
		Arithmetic Mean	Standard Deviation	Upper 95th Percentile	Maximum Contaminant Level[3]
1,1,1-Trichloroethane	6/28	2.1	4.6	3.9	200
1,1-Dichloroethane	7/28	0.7	0.5	0.8	5
1,1-Dichloroethene	8/28	3.5	9.5	7.1	6
1,2-Dichloroethane	11/28	2.0	3.1	3.2	0.5
Acetone	2/28	4.9	13.9	10.3	--
Benzene	2/28	0.5	0.06	0.5	1
Carbon Disulfide	2/28	0.6	0.2	0.6	--
Carbon Tetrachloride	11/28	1.8	2.8	2.9	0.5
Chloroform	13/28	2.2	3.1	3.4	100
cis-1,2-Dichloroethene	8/20	6.7	15.7	14.0	6
Ethylbenzene	1/28	0.5	0.003	0.5	680
Methylene Chloride	1/28	0.5	0.02	0.5	5
Tetrachloroethene	21/28	12.7	30.5	24.6	5
Toluene	2/28	0.5	0.07	0.5	1000
trans-1,2-Dichloroethene	3/8	0.6	0.2	0.8	10
Trichloroethylene	22/28	55.1	107.8	96.9	5
Xylene	1/28	0.5	0.01	0.5	1750

[1]Duplicate samples are averaged before summary statistics are calculated.
[2]Data taken from EFOUFS. Includes all wells except V10AMMW1.
[3]State or federal Maximum Contaminant Level (MCL), whichever is lower.

Note:
-- Indicates no available MCL.

Table ROD-3
Dose-Response Variables for Chemicals of Concern

	Systemic Toxicity (mg/kg/day)					Carcinogenic Potency (mg/kg/day)⁻¹						
Chemical	Organ Affected	Oral RfD	Source	Inhalation RfD	Source	Tumor Site	Oral Slope Factor	Weight of Evidence[1]	Source	Inhalation Slope Factor	Weight of Evidence[1]	Source
1,1,1-Trichloroethane	Liver	0.09	HEAST	0.3	HEAST	--	--	D	IRIS	--	D	IRIS
1,1-Dichloroethane	Liver	0.1	HEAST	0.1	HEAST	Mammary, Liver	--	C	IRIS	--	C	HEAST
1,1-Dichloroethene	Liver	0.0009	EPA	--	IRIS	Kidney, Adrenal	--	C	EPA	--	C	EPA
1,2-Dichloroethane	--	--	IRIS	--	IRIS	Stomach, Mammary, Liver	0.091	B2	IRIS	0.091	B2	IRIS
Acetone	Liver, Kidney	0.1	IRIS	--	IRIS	--	--	D	IRIS	--	D	IRIS
Benzene	--	--	IRIS	--	IRIS	Blood	0.029	A	IRIS	0.029	A	IRIS
Carbon Disulfide	Fetal Toxicity/Malformation	0.1	IRIS	0.003	HEAST	--	--	--	IRIS	--	--	IRIS
Carbon Tetrachloride	Liver	0.0007	IRIS	--	IRIS	Liver	0.13	B2	IRIS	0.13	B2	IRIS
Chloroform	Liver	0.01	IRIS	--	IRIS	Liver, Kidney	0.0061	B2	IRIS	0.081	B2	IRIS
cis-1,2-Dichloroethene	Blood	0.01	HEAST	--	IRIS	--	--	D	IRIS	--	D	IRIS
Ethylbenzene	Liver, Kidney	0.1	IRIS	0.3	IRIS	--	--	D	IRIS	--	D	IRIS
Methylene Chloride	Liver	0.06	IRIS	0.9	HEAST	Lung, Liver	0.0075	B2	IRIS	0.0016	B2	IRIS
Tetrachloroethene	Liver	0.01	IRIS	--	IRIS	Liver, Leukemia	0.051	B2	HEAST	0.002	B2	HEAST
Toluene	CNS, Eyes, Nose, Liver, Kidney	0.2	IRIS	0.6	HEAST	--	--	D	IRIS	--	D	IRIS
trans-1,2-Dichloroethene	Blood	0.02	IRIS	--	IRIS	--	--	--	IRIS	--	--	IRIS
Trichloroethylene	--	0.006	ECAO	--	IRIS	Lung, Liver	0.011	B2	HEAST	0.017	B2	HEAST
Xylene	Liver, Nose, Throat, CNS, Fetotoxicity	2	IRIS	0.09	HEAST	--	--	D	IRIS	--	D	IRIS

HEAST = Health Effects Assessment Summary Tables, EPA, 1991h.
IRIS = Integrated Risk Information System, EPA, 1992f.
EPA = 1,1-Dichloroethene is evaluated according to a modified-RfD approach: Group C carcinogens which exhibit weak evidence of carcinogenicity are compared to the oral RfD/10, EPA, 1990f.
ECAO = Environmental Criteria and Assessment Office, EPA, 1992e.
-- = Information not available.
CNS = Central Nervous System.

[1]Weight of Evidence Groups: A is Human Carcinogen; B is Probable Human Carcinogen (B1-limited evidence of carcinogenicity in humans, B2-sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans); C is Possible Human Carcinogen; D is Not Classifiable as to Human Carcinogenicity.

DA file name

Table ROD-4
Estimated Excess Lifetime Cancer Risk from
Domestic Use of Groundwater

Chemical	Average Exposure		Reasonable Maximum Exposure	
	Ingestion	Inhalation	Ingestion	Inhalation
1,1,1-Trichloroethane	--	--	--	--
1,1-Dichloroethane	--	--	--	--
1,1-Dichloroethene	--	--	--	--
1,2-Dichloroethane	6×10^{-7}	6×10^{-7}	3×10^{-6}	3×10^{-6}
Acetone	--	--	--	--
Benzene	5×10^{-8}	5×10^{-8}	2×10^{-7}	2×10^{-7}
Carbon Disulfide	--	--	--	--
Carbon Tetrachloride	8×10^{-7}	8×10^{-7}	4×10^{-6}	4×10^{-6}
Chloroform	5×10^{-8}	6×10^{-7}	2×10^{-7}	3×10^{-6}
cis-1,2-Dichloroethene	--	--	--	--
Ethylbenzene	--	--	--	--
Methylene Chloride	1×10^{-8}	3×10^{-9}	4×10^{-8}	9×10^{-9}
Tetrachloroethene	2×10^{-6}	9×10^{-8}	1×10^{-5}	6×10^{-7}
Toluene	--	--	--	--
trans-1,2-Dichloroethene	--	--	--	--
Trichloroethylene	2×10^{-6}	3×10^{-6}	1×10^{-5}	2×10^{-5}
Xylene	--	--	--	--
Total Risk	**6×10^{-6}**	**6×10^{-6}**	**4×10^{-5}**	**3×10^{-5}**

Table ROD-5
Estimated Noncancer Hazard Quotients from Domestic Use of Groundwater

Chemical	Average Exposure		Reasonable Maximum Exposure	
	Ingestion	Inhalation	Ingestion	Inhalation
1,1,1-Trichloroethane	0.0006	0.0002	0.001	0.0004
1,1-Dichloroethane	0.0002	0.0002	0.0002	0.0002
1,1-Dichloroethene	0.1	0.1	0.2	0.2
1,2-Dichloroethane	--	--	--	--
Acetone	0.001	0.001	0.003	0.003
Benzene	--	--	--	--
Carbon Disulfide	0.0002	0.005	0.0002	0.005
Carbon Tetrachloride	0.07	0.07	0.1	0.1
Chloroform	0.006	0.006	0.009	0.009
cis-1,2-Dichloroethene	0.02	0.02	0.04	0.04
Ethylbenzene	0.0001	0.00005	0.0001	0.00005
Methylene Chloride	0.0002	0.00002	0.0002	0.00002
Tetrachloroethene	0.03	0.03	0.07	0.07
Toluene	0.00007	0.00002	0.00007	0.00002
trans-1,2-Dichloroethene	0.0008	0.0008	0.001	0.001
Trichloroethylene	0.3	0.3	0.4	0.4
Xylene	0.000007	0.0002	0.000007	0.0002
Total Hazard Index	**0.5**	**0.5**	**0.9**	**0.9**

Table ROD-6
Uncertainties Associated With Risk Estimations

Uncertainty Factor	Effects of Uncertainty	Comment
I. Exposure Assessment		
Exposure assumptions	May over- or underestimate risk	Assumptions regarding media intake, population characteristics (e.g., body weight, life span, etc.), and exposure patterns may not characterize actual exposures.
Concentrations are assumed to be constant	May over- or underestimate risk	Does not account for environmental fate, transport, or transfer, which may reduce chemical concentration. Does not account for future degradation to potentially more toxic chemicals (e.g., PCE and TCE to vinyl chloride).
Contaminant loss during sampling	May underestimate risk	May underestimate VOCs present.
Estimating inhalation exposures for released VOCs from tap water	May over- or underestimate risk	Several variables affect the degree of exposure, including water temperature, etc.
Extent of sampling effort	May over- or underestimate risk	Sampling may not accurately characterize the medium being evaluated.
Chemical analysis procedures	May over- or underestimate risk	Systematic or random errors may occur during chemical analysis.
Intake	May underestimate risk	Assumes all intake of contaminants is from the exposure medium being evaluated (no relative source contribution).
II. Toxicity Assessment		
Cancer slope factor	May overestimate risk	Slope factors are upper 95th percent confidence limits derived from a linearized model. Considered unlikely to underestimate risk, especially for low doses.
Toxicity values derived from animal studies for carcinogenic and noncarcinogenic effects	May over- or underestimate risk	Extrapolation from animal to humans may induce error because of differences in absorption, pharmacokinetics, target organs, enzymes, and population variability.
Toxicity values derived primarily from high doses, most exposures are at low doses	May over- or underestimate risk	Assumes linear dose response relationship at low doses. Possibility that some thresholds do exist.
Toxicity Values	May over- or underestimate risk	Not all values known with the same degree of certainty. May change as new evidence becomes available.
Toxicity values derived from homogeneous animal populations	May over- or underestimate risk	Human population may have a wide range of sensitivities to a chemical.

Table ROD-7
Groundwater Monitoring Program-Existing Wells

Well Number	Total Depth (ft)	Perforated Intervals (ft)								Quarterly Sampling Through Other Programs	Status
		1st	2nd	3rd	4th	5th	6th	7th	8th		
11900038	630	350-614								x	Active
01900028	600	250-580								x	Active
01900831	500	252-474									Inactive
01900029	615	264-582									Inactive
01900882	500	199-252	280-485								Inactive
01902920	500	238-314	366-384								Active
01903012	NA	NA									Inactive, capped
78000098	1,078	760-769	824-836	855-938	942-952	980-992	1,024-1,032			x	Active
01900031[1]	600	300-585									Active
01900035[1]	600	254-587									Inactive
01902169[1]	280	120-280									Inactive
71903093	506	272-421	440-466	477-497							Inactive, capped
08000039	622	540-582	594-602								Inactive
08000060	600	300-600								x	Active
51902858	500	174-214	240-264	312-346	390-474					x	Active
01901460	947	600-947								x	Active
01902859	400	155-179	185-203	210-323	355-390					x	Active
08000062	743	550-743								x	Active
01901611	240	120-152	235-240	204-220							Inactive

Table ROD-7
Groundwater Monitoring Program-Existing Wells

Sheet 2 of 2

Well Number	Total Depth (ft)	Perforated Intervals (ft)								Quarterly Sampling Through Other Programs	Status
		1st	2nd	3rd	4th	5th	6th	7th	8th		
08000095	NA	NA								x	Active
08000069	846	566-642	679-695	787-825						x	Active
01901600	300	NA									Inactive
01901598	400	120-349								x	Active
08000070	451	290-435									Active
MW5-01[2]	1,521[3]	216-226	287-297	335-345	430-440	523-533	640-650	765-775	875-885		Monitoring well
Z1000006	300	75-175	180-195	200-300							Monitoring well
W10NCMW1	NA	NA								x	Site assess. well
W11AZW01	354	148-354								x	Site assess. well
W11AZW03	385	180-385								x	Site assess. well
W11AZW09	NA	NA								x	Site assess. well

NA-Information not available.
[1]Proposed extraction well.
[2]EPAW5101-EPAW5113.
[3]Other perforated intervals = 1,030-1,040; 1,123-1,133; 1,256-1,266; 1,387-1,397; 1,496-1,505 feet.

Table RS- ROD-8
Groundwater Monitoring Program- New Wells
(Proposed Plan Alternative)

Well No.	Total Depth (ft)	Perforated Intervals (ft)[1]							
		1st	2nd	3rd	4th	5th	6th	7th	Monitoring Well Purpose
MW5-02	1,800[2]	200-210	300-310	400-410	500-510	600-610	700-710	800-810	Monitoring for most of the aquifer downgradient of Subarea 3 to fill a data gap for remedial design and to monitor remedial effectiveness
MW5-03	1,200[3]	300-310	400-410	500-510	600-610	700-710	800-810	900-910	Monitoring across the entire aquifer downgradient of Subarea 1 to fill a data gap for remedial design and to monitor remedial effectiveness
MW5-04P (3)	250	180-240							Three piezometers located around Cluster 4 to evaluate remedial effectiveness of extraction, not needed for remedial design
MW5-05[4]	600	190-200	390-400	580-590					Monitoring at Cluster 5 to provide contaminant data for remedial design prior to installation of the extraction well
MW-05P (3)	250	180-240							Three piezometers located around Cluster 5 to evaluate remedial effectiveness of extraction, not needed for remedial design
MW5-06P (3)	250	180-240							Three piezometers located around Cluster 6 to evaluate remedial effectiveness of extraction, not need for remedial design
MW5-07	600	190-200	390-400	580-590					Fill data gap for remedial design and provide upgradient early warning monitoring for Cluster 5 during implementation
MW5-11[4]	700	290-300	490-500	680-690					Monitoring at Cluster 13 to provide contaminant data for remedial design prior to installation of the extraction well
MW5-12	650	250-260	450-460	630-640					Upgradient early warning monitoring for Cluster 4 during implementation, not needed for remedial design
MW5-13	700	340-350	510-520	680-690					Fill data gap for remedial design and provide upgradient early warning monitoring for Clusters 10 and 13 during implementation
MW5-14	650	250-260	450-460	630-640					Fill data gap for remedial design and provide upgradient early warning monitoring for Cluster 4 during implementation
MW5-15	700	190-200	450-460	680-690					Fill data gap for remedial design and provide upgradient early warning monitoring for Cluster 6 during implementation
MW5-16	600	340-350	460-470	590-600					Provide additonal data on vertical distribution of contamination at location of known shallow contamination

Table RS- ROD–8 Groundwater Monitoring Program- New Wells (Proposed Plan Alternative)									
Well No.	**Total Depth (ft)**	**Perforated Intervals (ft)[1]**							
		1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**Monitoring Well Purpose**
MW5-17	700	500-510	680-690						Provide additional data on the lateral and vertical extent of contamination away from facilities in Subarea 1
MW5-18[4]	600	450-460	580-590						Monitoring at Cluster 10 to provide deeper contaminant data for remedial design prior to installation of the extraction wells

[1]Subject to revision/change.
[2]MP monitoring well- other perforated intervals = 1,000-1,010; 1,200-1,210; 1,400-1,410; 1,600-1,610; 1,780-1790
[3]MP monitoring well- other perforated intervals = 1,000-1,010; 1,100-1,110; 1,180-1,190
[4]To be located at corresponding extraction well cluster site.

PART III. RESPONSIVENESS SUMMARY FOR PUBLIC COMMENTS ON THE BALDWIN PARK OPERABLE UNIT

TABLE OF CONTENTS

Comments Requiring Lengthy Responses

Responses to Other Comments *(Comments are grouped into six categories and organized alphabetically within each category)*

...Responses to Comments from Individuals and Interest Groups

...Responses to Comments from Federal and State Legislative Representatives

...Responses to Comments from The California Department of Toxic Substances Control

...Responses to Comments from Water Purveyors, Water Districts, and the Watermaster

...Responses to Comments from San Gabriel Valley Businesses and Business Representatives

INTRODUCTION

The Responsiveness Summary summarizes and responds to all significant comments received during the public comment period for the Remedial Investigation, Feasibility Study, and Proposed Plan for the Baldwin Park Operable Unit (OU) of the San Gabriel Valley Superfund Sites in Los Angeles County, California[1]. The public comments period ran from May 13 through August 12, 1993. Twenty-six individuals and organizations submitted more than 400 comments. Most commentors submitted between one and ten comments; one commentor submitted approximately 250 comments.

This summary is divided into two sections. The first section provides responses to comments that were submitted multiple times or which require lengthy responses. These responses are labeled Responses A through F. The second section of the Responsiveness Summary presents a restatement (in quotation marks) or paraphrased version of each significant comment received, and EPA's response. The majority of the comments were submitted in writing; oral comments made during the EPA-sponsored public meeting held in Baldwin Park on May 20, 1993 are included last.

Some comments, and EPA's responses, refer to a page, Figure, Table, or section number. If not noted otherwise, these numbers refer to the two-volume Baldwin Park Operable Unit Feasibility Study, included in the Baldwin Park Operable Unit Administrative Record as AR Numbers 394 and 395.

Copies of all written comments received by EPA are included in the Baldwin Park OU Administrative Record, available for review at EPA's regional office in San Francisco and at the West Covina Public Library in West Covina, CA. The transcript of the public meeting, including all of the questions, comments and responses made during the meeting, is also included in the Record.

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[1]One set of comments submitted by Aerojet General Corporation, Azusa Land Reclamation Company, and Oil Solvent Process Company after the close of the public comment period are also addressed.

BALDWIN PARK OU RESPONSIVENESS SUMMARY

RESPONSE A. THE NEED FOR ACTION IN SUBAREA 3: RESPONSE TO THE PLUME STABILIZATION/PLUME EQUILIBRIUM HYPOTHESIS

In their Comments on the Feasibility Study Report and Proposed Plan for the Baldwin Park Operable Unit, dated August 1993, the San Gabriel Basin Industry Coalition (the Coalition) opposes EPA's proposed remedial action in Subarea 3. The Coalition asserts that "sufficient data exist to suggest that the contaminant plume has "stabilized" and may be at or reaching equilibrium." They argue that "additional data need to be gathered and analyzed to confirm or refute" their hypothesis that plume equilibrium has been achieved.

We first present a summary of our response. A detailed response follows.

SUMMARY OF RESPONSE

- There is evidence of continued contaminant migration in and immediately downgradient of Subarea 3. The Coalition ignores this evidence in their comments.

- The Coalition claim of "plume oscillation and retraction" results from a misinterpretation of water quality data.

- The Coalition claim of "plume stabilization/equilibrium" is at odds with the widely-accepted belief that advective forces dominate contaminant transport in high-velocity sand and gravel aquifers such as in the Baldwin Park area. The Coalition lists processes known to resist advective forces or remove contaminant mass and then speculates that the identified processes collectively could stabilize the plume. The Coalition does not offer site-specific or quantitative evidence that the listed processes will do so and ignores site-specific evidence that the listed processes are not significant in Subarea 3 and do not contribute to plume equilibrium. The Coaltion fails to support their unfounded, unconventional hypothesis.

- The field investigations proposed by the Coalition are unlikely to prove or disprove the Coalition hypothesis. A much more extensive and costly investigation would be needed to prove or disprove that the plumes have stabilized and to monitor indefinitely for any further contaminant movement. Enough wells would be needed to delineate and then detect changes in the size and composition of individual contaminant plumes. EPA believes that additional field investigations are needed to support the design of the proposed remedy, but not to establish the need for remedial action in Subarea 3. The millions of dollars that would be spent on exhaustive site characterization to evaluate the Coalition hypothesis would be better directed toward clean up.

- The objectives of EPA's remedy are to limit contaminant migration *and* remove contaminant mass. The Coalition does not disagree that EPA's proposed remedy would remove significant contaminant mass in Subarea 3.

We conclude that the Coalition comment does not lessen the need for remedial action in Subarea 3.

The detailed response that follows includes a presentation of site-specific evidence that clearly indicates the continued migration of contamination, followed by an evaluation of the effect of each of the processes or factors identified by the Coalition as potentially contributing to plume equilibrium. Finally, we explore the scope and types of investigations that would be required to demonstrate plume equilibrium.

DETAILED RESPONSE

A.1 Evidence of Continued Contaminant Migration

In part A.1 of this response, we evaluate three important indicators of continued migration of the groundwater contamination in Subarea 3:

- increasing contaminant concentrations at wells within or just downgradient of the Subarea;
- increasing areal extent of contaminant plumes; and
- favorable hydraulic conditions for advective contaminant transport.

<u>Increasing Contaminant Concentrations</u>

The Coalition comments imply that if the groundwater contamination is spreading, contaminant concentrations should be uniformly rising in existing downgradient wells. We believe that this is an unreasonable test of continued contaminant migration for reasons described in part A.2 of this response. The absence of increasing concentration trends in existing wells would not prove or disprove the continued migration of the groundwater contamination.

Documentation of increasing concentration trends at wells located near the downgradient end of the Subarea must, however, be viewed as an indicator of continuing contaminant migration. There are 10 wells located either within the downgradient portion of Subarea 3 or just downgradient of the Subarea that have been sampled over the last 4 to 5 years. Sampling results since 1988 (see Figures RS-9, 10, 11) show increasing concentrations at six of these wells for either trichloroethylene (TCE) or carbon tetrachloride (CTC). The six wells, and the contaminant showing the increase, are:

Paddy Lane (01900031)-	TCE
La Puente No. 2 (01901469)-	TCE
La Puente No. 3 (01902859)-	TCE
La Puente No. 4 (08000062)-	TCE
San Gabriel Valley B4B (51902858)-	CTC
San Gabriel Valley B4C (51902947)-	CTC

These data provide a very strong indicator of continuing contaminant migration in the area. In fact, concentrations of TCE in the Paddy Lane well (within Subarea 3) and the La Puente wells (just downgradient of Subarea 3) have reached all-time highs within the last year. Also in the last year or so, increasing contaminant concentrations have forced La Puente Valley County Water District, San Gabriel Valley Water Company, and Cal Domestic Water Company to install wellhead treatment at their Baldwin Park area wells.

<u>Increasing Areal Extent of Contaminant Plumes</u>

Increasing areal extent of contaminant plumes is another prime indicator of contaminant migration in the subsurface. It is difficult, however, to measure increases or decreases in areal extent in Subarea 3 because individual plumes have not been delineated. Uniform movement of the broadly-defined "area of contamination" would not be expected and, further, could not be detected with the available downgradient monitoring points.

A key point in the Coalition plume equilibrium theory is their assertion that there has been an "oscillation" of the downgradient extent of contamination in the vicinity of the I-10 freeway. They state that evidence exists to indicate downgradient movement of the "plume" between 1980 and 1985 and an apparent "retraction of the Subarea 3 TCE plume" during 1985 to 1990. This interpretation is unsupported; data are not available to support either the "oscillation" or "retraction" claim. The downgradient wells apparently used to support their claim (as shown in the figure in Appendix E of the Coalition's comments) are San Gabriel Valley's B4 wells (well nos. 51902858 and

51902947). These wells were deepened in the late 1980s and the screened intervals were changed from approximately 175 to 475 feet below ground surface (bgs) to approximately 900 to 1100 feet bgs. Thus, the post-1988 sampling data are not comparable to the earlier data and cannot in any way be used to claim "plume oscillation."

There are no other data available to support the claim of plume "retraction" or "oscillation". There are no monitoring locations in the upper several hundred feet of the aquifer at this location or for nearly a mile downgradient.

Hydrogeologic Conditions in Subarea 3

Hydrogeologic conditions in Subarea 3 are favorable for advective transport of contaminants in the aquifer. Using a range of hydraulic conductivity values (150 to 300 feet/day), an effective porosity of 0.25, and a range of horizontal gradients (0.001 to 0.025) for Subarea 3, the estimated average linear groundwater flow velocity in Subarea 3 ranges from approximately 200 to 1,000 feet/year. And, as illustrated in Figure 2-3 and Plates 2, 3, and 5 of the Feasibility Study, the lithology of Subarea 3 is predominantly coarse-grained deposits, with relatively small percentages of fine-grained, organic-rich sediments such as silt and clay. In this type of coarse-grained, high-velocity groundwater flow environment it is widely-accepted that advection is the primary contaminant transport process. In the absence of site-specific, quantitative data to the contrary, it is reasonable to assume that contaminant migration will continue within and out of the Subarea. Very high retardation rates and active degradation mechanisms would be required to offset the large advective influence. The presumption must be that the contaminated groundwater will continue to migrate.

A.2 ABSENCE OF SITE-SPECIFIC EVIDENCE FOR "PLUME EQUILIBRIUM"

In their comments, the Coalition selectively present evidence and arguments in support of their hypothesis. In this section, we examine the Coalition claims and identify significant deficiencies in the Coalition evaluation. We examine and respond to three claims:

- Are contaminant concentration trends stagnant or declining?
- Is there site-specific evidence that contaminant fate and transport mechanisms are at work at rates to stop migration?
- Do conditions in Subarea 3 differ significantly from conditions in Subareas 1 and 2 where the Coalition acknowledges that migration is occurring?

We believe that the answer to each of these questions is no.

Are Contaminant Concentration Trends Stagnant or Declining?
Answer: No.

If plume equilibrium has been reached in Subarea 3, then contaminant concentrations throughout and downgradient of the Subarea should be stagnant or declining. The only concentrations potentially increasing would be those of degradation "daughter" products, and these should be associated with a corresponding decline in the "parent" products.

Contaminant concentrations are not, as asserted by the Coalition, uniformly stagnant or declining in and downgradient of Subarea 3. As described in part A.1 of this response (and shown in Figures RS-9 to 11), concentrations of the primary contaminants TCE and CTC have increased at 6 of the 10 wells in the area over the last 4 years. This indicates that contamination is continuing to migrate within and downgradient of Subarea 3. Three other wells show decreasing trends of the primary contaminant (either TCE or CTC).

The reasons that the increasing concentration trends are accompanied by some declining concentration trends are difficult to determine due to the complexity of the contaminant sources and variability in groundwater flow conditions. One likely cause of of the trends is the variability in groundwater flow direction due to changes in the location, amount, timing, and duration of pumping and recharge. Accepting the Coalition's tenuous "plume equilibrium" hypothesis would require rejection of this more likely explanation. Changes in flow direction can cause wells that formerly sampled "middle-of-the-plume" concentrations to later sample lower "plume fringe" concentrations. The only way to dismiss this explanation would be the installation and long-term sampling of a large number of monitoring wells in the hope of delineating individual plumes, installation of wells known to be at or near the "centerline" of each plume, and then sampling long enough to show that contaminant concentrations remain stable or decline. The feasibility of such an effort is discussed in part A.3 of this response.

Another possible explanation for the declining concentrations observed in selected wells is variability in the timing, duration, and magnitude of the original sources of contamination. Uncertainty about the sources of contamination makes it difficult to determine if observed decreases in concentrations are temporary, reflecting temporary decreases in the amount of contaminants originally released into the subsurface, or are evidence of plume equilibrium.

Is There Site-specific Evidence that Contaminant Fate and Transport Mechanisms are at Work at Rates to Stop Migration?
Answer: No.

As organic contaminants come into contact with groundwater, they dissolve and become solute. There are a number of physical and chemical processes that affect the transport of solute in groundwater. These include: advection, molecular diffusion, mechanical dispersion, retardation, and degradation. Advection, the transport of a contaminant by bulk groundwater flow (i.e., as groundwater moves, so do the dissolved contaminants), is the primary process by which contaminants migrate downgradient. Retardation and degradation act to slow, not stop, the movement of contaminants relative to the movement of the groundwater. Although it is widely accepted that in high-velocity sand and gravel aquifers (e.g., Subarea 3) advective forces dominate contaminant transport, the Coalition claims just the opposite is occurring in Subarea 3. The Coaltion has failed to support this hypothesis.

The Coalition has listed and described the general nature of contaminant fate processes that may influence contaminant movement in Subarea 3, but has not presented any site-specific evaluations of conditions in the Subarea.

The Coalition cites mechanisms that can contribute to plume equilibrium in Subarea 3 by either reducing the contaminant mass entering the Subarea (source reduction), reducing contaminant concentrations in groundwater within the Subarea (retardation, dilution, biological degradation), or removing contaminant mass from the aquifer within the Subarea (contaminant removal, volatilization). Each of these mechanisms may have some effect, but we believe it extremely unlikely that their combined magnitude could completely stop contaminant migration. Each mechanism is discussed in more detail below.

Contaminant Removal

Contaminant removal by active groundwater production wells within and just downgradient of Subarea 3 is minimal. The average contaminant removal rate is estimated below for the period between July 1987 and June 1992 using the average extraction rate over this five-year period for all of the active production wells in Subarea 3 and the average total concentration of chlorinated volatile organic compounds (CVOCs) in each well or well cluster:

Well	Extraction Rate acre-feet/day	Average Conc. µg/l	Removal Rate pounds/day
Palm Ave. (08000039)	0.0005	17	0.00002
Paddy Lane (01900031)	0.005	62	0.0008
Big Dalton (01900035)	0.0	64	0.0
B6B,B6C (71903093, 71900721)	0.0	28	0.0
B6D (78000098)	8.35	2.8	0.064
La Puente Cluster (01901460, 01902859, 08000062)	4.7	8.5	0.11
		Total:	0.175

Although this average removal rate of 0.175 pounds per day certainly helps in the remediation of contamination in the Subarea, it is not a significant number given the contaminant mass already in-place in Subarea 3 (in the 1,000s of pounds range given the average CVOC concentrations detected in the Subarea and the estimated size of the contaminated area), and the upgradient contaminant mass in Subarea 2 that will eventually migrate into Subarea 3.

Source Reduction

The Coalition argues that "better management practices by users of chlorinated solvents in the 1960s and 1970s" resulted in reduced contaminant releases.

Although neither the Coalition nor individual Potentially Responsible Parties (PRPs) have provided EPA with any data to verify their claim (e.g., data comparing the volume of contaminants released pre-1960 to the volume released since 1960), it is indeed likely that the magnitude of *surface* sources has declined over the years. However, given the considerable extent of groundwater contamination already present in Subareas 2 and 3, the large number of industrial sources located upgradient where significant contamination has been detected in the vadose (unsaturated) zone, it is quite likely that sizable, residual *subsurface* sources exist that will continue to be a source of dissolved contamination for many years to come.

Dilution

Dilution of contaminated groundwater from recharge or infiltration of uncontaminated water acts to reduce the mass per unit area or volume in the aquifer by spreading the contamination into a larger volume of water, but does not reduce the mass of contamination present in the aquifer. Dilution of contaminant concentrations by recharge/infiltration within Subarea 3 is unlikely to be significant. The Subarea is mostly paved, with little opportunity for substantial infiltration and no facilities for artificial recharge. Thus, it is unclear how dilution has any impact on contributing to "plume equilibrium" in Subarea 3, as the Coalition claims.

The large volumes of water recharged to the aquifer in spreading facilities upgradient of Subarea 3 do indeed affect the contaminant concentrations observed entering the Subarea, both by dilution and by influencing groundwater flow directions and rates. However, these upgradient impacts do not contribute to "plume equilibrium" within Subarea 3. Instead, it is probable that the net effect of the large-scale recharge at the Santa Fe Spreading Grounds is to periodically increase the local gradient, thereby disrupting any equilibrium that might have been achieved, by either sorption (retardation) or biological degradation, discussed further below.

Retardation

Sorption and desorption of organic solute (e.g., CVOCs) by the organic component of the aquifer material, commonly referred to as retardation, decreases the velocity of solutes in groundwater. The amount of sorption of solutes onto the aquifer material is primarily a function of: 1) the organic content of the aquifer; 2) the mineralogy of the aquifer material, particularly the clay content; and 3) the chemical characteristics of the solute.

In general, the primary factor controlling the retardation rate in the aquifer is the organic carbon content of the aquifer materials. Although we do not have any total organic carbon measurements from the aquifer in Subarea 3, the occurrence of organic carbon is typically associated with the clay content of an aquifer. As discussed above, and in the Feasibility Study and Interim Remedial Investigation Reports, the aquifer in Subarea 3 is very coarse-grained. Although there is a slightly higher percentage of fine-grained materials in Subarea 3 than further upgradient in Subareas 1 and 2, the aquifer still consists of an overwhelming majority of sand and gravel. This implies that retardation rates in the Subarea are quite low.

The amounts of contamination sorbed onto aquifer materials and dissolved in groundwater are related. Over time, if contaminant concentrations in groundwater decline, any contaminants that have sorbed will dissolve. Thus, even if retardation rates were high, without some type of contaminant removal or active degradation (discussed below), retardation alone will only affect the rate of contaminant movement between different portions of the aquifer, not contribute to the long-term containment and remediation of contamination.

Biological Degradation

The Coalition points to degradation as another "plume attenuation mechanism" contributing to plume equilibrium in Subarea 3. The Coalition claims that "there is evidence of significant degradation of chlorinated ethenes (as evidenced by the presence of daughter products in increasing ratios) as one moves downgradient in the plume". Although there is a higher ratio of daughter products in some downgradient wells, there are also wells (both upgradient and downgradient) where this generalization doesn't hold true. In fact, in Subarea 3, TCE is still the primary contaminant detected in groundwater samples.

In general, aromatic compounds such as benzene, toluene, and xylene, can degrade fairly rapidly under both aerobic or anaerobic conditions. However, for halogenated aliphatic compounds such as the chlorinated ethenes (PCE, TCE, DCE, etc.), anaerobic conditions are necessary for significant degradation to occur (except where high concentrations of more readily degraded compounds allow the co-metabolism of halogenated compounds). Although site-specific data are not available, there is no evidence to suggest that widespread anaerobic conditions are present in Subarea 3.

Degradation or "daughter" products, such as dichloroethenes and dichloroethanes, are present in most of the wells monitored within the Subarea, but concentrations of these compounds are much lower than the concentrations of TCE (TCE is typically detected at concentrations 3 to 5 times higher than all of the potential degradation products combined). This implies that, although it is likely that some degradation is occurring, it is not "significant." In addition, there is the possibility that dichloroethenes and dichloroethanes themselves could have been released at some sites. Even if there were "significant" degradation occurring, the daughter products, some of which (e.g., vinyl chloride) are more carcinogenic than the parent products, would continue to migrate downgradient. Only the rate would be affected. Only complete degradation, leaving no hazardous constituents, will stop contaminant migration and assist in aquifer remediation. The presence of vinyl chloride would be a good indicator of active degradation proceeding towards completion, however, vinyl chloride has not been detected in the Subarea.

Volatilization

The Coalition defines volatilization as the "transfer of contaminant mass from the aqueous phase to the vapor phase, enhanced by water table fluctuations, reducing the aqueous phase concentrations." The Coalition further states that "it is not clear at this point whether volatilization is a significant factor or not." As illustrated in Section 3 of the Feasibility Study, in Subarea 3, high levels of contaminants are spread across the upper several hundred feet of the aquifer. Therefore, any volatilization that does occur will impact only a very small percentage of the overall contaminant mass. The remainder of the contaminated water can continue to migrate. In addition, transfer of contaminants to the vadose zone is, in part, a reversible process. Contaminants that do transfer to the vadose zone can be transferred back to the saturated zone with infiltrating water or by desorption during the next water level rise. Some contaminants could potentially volatilize and move into the shallow vadose zone or atmosphere by diffusion, but the considerable depth to water would limit this (average depth to groundwater in the Subarea exceeds 100 feet). It is unlikely that volatilization plays a significant role in reducing contaminant migration in Subarea 3.

Do Conditions in Subarea 3 Differ Significantly from Subareas 1 and 2?

Answer: No.

For plume equilibrium to occur in Subarea 3, but not in Subareas 1 and 2, physical, chemical, and biological conditions in Subarea 3 (e.g., lithology, hydraulic conductivity, groundwater extraction) must be significantly different than those in other subareas.

The Coalition offers some generalizations about conditions and processes that they claim contribute to plume equilibrium, but they do not offer any specifics that differentiate Subarea 3 from the upgradient areas where the Coalition acknowledges that migration is occurring. A comparison of key parameters is provided below:

Lithology: Comments from both the Coalition and Aerojet Gencorp (Aerojet) describe significant changes in lithology moving downgradient through the Baldwin Park area. The purported increase in fine-grained sediments in Subarea 3 is used to justify reducing hydraulic conductivity estimates (see below) and claim increased retardation resulting from higher total organic carbon (TOC) levels. Although there is indeed a slight increase in finer-grained materials and a decrease in cobbles toward the downgradient end of Subarea 3, the available lithologic logs (Plates 1 though 6 in the FS) show that the aquifer materials are still predominantly sand and gravel. The more dramatic increase in fine-grained materials occurs further downgradient, well beyond the Subarea (FS, Figure 2-3 and Plate 1).

Hydraulic Conductivity. Comments from the Coalition and Aerojet also both claim that hydraulic conductivity values are significantly lower in Subarea 3 than in the other Subareas. Again, this claim is not supported by actual estimates from field measurements. As shown in the Table below, there is not a trend of decreasing hydraulic conductivity estimates towards the downgradient end of Subarea 3.

Groundwater Extraction. Again, the Coalition and Aerojet both cite groundwater extraction's effect on groundwater flow conditions in Subarea 3 as another condition contributing to "plume equilibrium." However, as shown above in the discussion of contaminant removal, there is virtually no groundwater extraction occurring in Subarea 3. The pumping wells that the Coalition and Aerojet are apparently referring to are found in four well clusters located between 1,200 and 4,800 feet downgradient or cross gradient from the lower boundary of the Subarea. Thus, they cannot contribute to plume equilibrium within the Subarea; rather their presence reinforces the need to contain higher levels of CVOCs in Subarea 3. In addition, all of the extraction at two of the clusters (San Gabriel Valley's B4 and B6 clusters) is from greater than 750 feet below ground surface. At a third cluster (Suburban's cross-gradient 139 cluster), over half of the production is from more than 550 feet below ground surface. Extraction at these depths has little impact on the primary contaminated interval in Subarea 3 located between approximately 150 and 650 feet below ground surface.

Baldwin Park Area Hydraulic Conductivity Estimates				
Well	Agency	Subarea	Hydraulic Cond. (ft/day)	Data Point
Morada- 01900029	EPA	upgrad. 2	345	pumping well
Lante- 08000060	EPA	mid. 2	5,062	pumping well
Baldwin 3- 01900882	EPA	downgrad. 2	300-706	observ. wells
Baldwin 3- 01900882	Watermaster	downgrad. 2	414	pumping well
Big Dalton- 01900035	EPA	mid. 3	297	pumping well
Paddy Ln.- 01900031	EPA	downgrad. 3	668-809	pumping well
B6B- 71900721	Watermaster	downgrad. 3	263	pumping well
B6C- 71903093	EPA	downgrad. 3	520-559	observ. well
140W4- 08000093	EPA	downgrad. of 3	267-298	observ. well

A.3 Coalition Proposed Investigations and Criteria to Evaluate the Plume Equilibrium Hypothesis

The Coalition offers an unconventional hypothesis. To *prove* this unconventional hypothesis, the Coalition would need to obtain and properly interpret a large amount of site-specific data.

The Coalition has proposed a "Characterization Study" to satisfy the need for site-specific data. EPA does not oppose independent data collection efforts, but we disagree with the Coalition claim that these data would be useful to "evaluate the need for remedial action in Subarea 3" or to "demonstrate whether the plume is migrating and should be contained or has reached equilibrium and containment actions are not necessary."

The Coalition proposed study includes installation of six monitoring well clusters, monthly collection of water quality samples for one year, groundwater modeling of contaminant transport processes and quantification of contaminant mass balance. In addition, the Coalition has outlined factors to be used as a basis for development of criteria to determine the need for containment. These factors are:

- "Whether monitoring points established downgradient of the current plume show contaminant levels which remain below a specified threshold concentration."

- "Whether monitoring points established along the centerline of the current plume in Subarea 3 show a statistically significant increase in concentrations."

- "Whether variations in the observed trends in both sets of monitoring points reflect downgradient changes in contaminant mass."

- "Whether observed current and historical trends can be accurately reproduced by modeling so that future changes can be accurately predicted."

We believe that the Coalition proposed characterization study and potential criteria are unlikely to prove or disprove the Coalition hypotheses. We do not believe that they represent a reasonable indicator of or test for contaminant migration, and that they reflect a misconception of conditions in Subarea 3. There are a number of complicating circumstances that make it unlikely that continuous, statistically significant trends will be observed along the "plume centerline" described by the Coalition or in most other locations within Subarea 3. To truly perform a characterization study to evaluate potential plume equilibrium in Subarea 3, a thorough understanding of both the nature and extent of contamination, and the detailed, exact nature of lithologic heterogeneity in the Subarea are required.

The Coalition description of a "plume centerline" incorrectly represents the area of contamination delineated in Subarea 3 as a single contaminant plume. In its Feasibility Study and Proposed Plan, EPA shows approximate areas of groundwater contamination, rather than multiple plumes with well-defined boundaries, but this representation does not imply that there is a single plume; instead it reflects the lack of enough water quality data to delineate individual contaminant plumes.

The area of contamination most likely contains numerous individual or commingled plumes that originated at multiple sources from contaminant releases varying in magnitude, timing, and duration. In addition, neither the initial surface releases nor residual subsurface sources have been fully characterized, nor are the highly transient nature of the recharge and discharge stresses affecting groundwater flow and contaminant migration, or the presence of preferential pathways along "corridors" of higher hydraulic conductivity, likely to be characterized to the extent needed to prove or disprove the Coalition hypotheses.

Although the lithology in the area is predominantly sand and gravel, the presence of preferential pathways along individual zones of very high conductivity (i.e., buried river channels) further complicates the distribution of contamination and our ability to prove <u>either</u> absolute equilibrium or complete control of migration. In addition, the highly-variable pumping and recharge conditions in the Baldwin Park area have significant impacts on the direction and rate of groundwater flow and, thus, contaminant movement, in Subarea 3. All of these factors contribute to what is likely a complex distribution of contamination in the Subarea. EPA believes that it is unnecessary to more precisely define the exact location and extent of the individual plumes in the Baldwin Park area before proceeding with its proposed interim remedy.

The Coalition proposal would require that individual contaminant plumes be located and characterized *before* any detailed field investigation could detect contaminant migration downgradient of or along the centerline of plumes. The investigation would need to include information of sufficient detail to establish that no zones of higher hydraulic conductivity exist throughout the lateral and vertical extent of the "equilibrium boundary." These zones could be anywhere from 10s to 100s of feet wide and thick. (See Response C for further description of lithologic variability. Essentially, contamination is known to preferentially migrate within zones of higher hydraulic conductivity; such zones are likely in this depositional environment and would need to be identified.)

Furthermore, to "prove" that containment is not now and will never in the future be necessary in Subarea 3, a monitoring program near the downgradient end of each individual plume would be needed. To take the first step alone and identify the individual plumes would require literally dozens of monitoring well clusters (not just the six wells proposed by the Coalition). Subarea 3 covers an area approximately two miles long by one mile wide. The second step of the investigation (monitoring for contaminant migration) would require additional, more focused monitoring at the end of each contaminant plume identified.

The second part of the Coalition proposed "Characterization Study" involves contaminant transport modeling and quantifying the mass balance of contaminants in the Subarea. Because of the lack of data and numerous assumptions that would be required, neither of these efforts is likely to provide any firm, reliable conclusions. Perhaps the key parameter in both of these tasks is information on the location, magnitude, duration, and timing of contaminant sources. At the present time, there is little or no information available on contaminant sources throughout the Baldwin Park area (including the likely presence of residual subsurface sources such as dense non-aqueous phase liquids [DNAPLs]). Given the number of potential sources present and the long period over which releases may have occurred, it is unlikely that adequate information will ever be available to adequately estimate these parameters. Combine this with the numerous additional assumptions on contaminant fate parameters required to perform contaminant transport modeling, and it is likely that <u>investing substantial resources into modeling will only lead to disputes over model inputs and results</u>, not to "accurate predictions of future changes" in contaminant conditions.

BALDWIN PARK OU RESPONSIVENESS SUMMARY

RESPONSE B: THE RATIONALE FOR THE SCOPE, SIZE, AND PUMPING CONFIGURATION OF THE SELECTED REMEDY

B.1 Philosophy for Remediating Contaminated Groundwater Sites

Remedial actions at sites with contaminated groundwater almost always try to stop or limit further movement of the contaminated groundwater into downgradient areas. Typically, these groundwater "migration control" or "containment" actions are implemented at the downgradient "leading edge" of the contaminant plume or plumes. And, in most cases, containment is achieved through groundwater extraction. At sites where the contaminated area is large or extends deep into the aquifer, groundwater extraction is currently the only feasible option for providing adequate containment. This type of remedial action inhibits contaminant migration beyond the extraction locations, protects downgradient areas that are clean or less contaminated, and can remove a significant mass of contamination. EPA regulations and guidance, and experience at countless other Superfund sites, highlight the importance of limiting the spread of contamination at contaminated groundwater sites.

There is a drawback associated with using groundwater extraction to inhibit downgradient migration of contamination, particularly if the area of contamination is large. The drawback is increased contaminant concentrations in the portion of the aquifer between the source and the extraction locations. Groundwater extraction actually increases the hydraulic gradient and accelerates the movement of groundwater located upgradient of the extraction wells. The upgradient groundwater, which is closer to the source of contaminants and will generally have higher contaminant concentrations, will be pulled towards the extraction wells through the less contaminated portion of the plume. Thus, extraction at the leading edge of the plume, while protecting downgradient areas, will often degrade groundwater quality in the portion of the plume between the source area and the extraction location(s), at least temporarily. This drawback is usually considered to be of much less significance than the remedial benefits associated with providing protection to the uncontaminated or less contaminated areas downgradient.

B.2 Rationale for EPA's Proposed Extraction Areas (the Subareas)

Remedial Objectives for the Baldwin Park OU

As stated in the FS, EPA's remedial objectives for the Baldwin Park OU are to:

- inhibit contaminant migration from more highly contaminated portions of the aquifer to less contaminated areas or depths to reduce the impact of continued contaminant migration on downgradient water supply wells, and to protect future uses of less contaminated and uncontaminated areas; and
- to remove contaminant mass.

EPA's remedial objectives, and the remedy described in the FS, Proposed Plan, and ROD, are consistent with the philosophy for remediating contaminated groundwater sites described above. Extraction is proposed in areas where there is a significant decrease in contaminant concentrations in order to protect downgradient, less-contaminated areas from the more contaminated groundwater present upgradient.

Aerojet/ALR submitted several comments on the relative importance of the *migration control* and *mass removal* objectives. The comments vary in wording, but all argue that *mass removal* should be given greater weight. The comments include:

> ... the two objectives should be equally weighted...
> ... EPA must consider the *mass of contaminant removed per acre-foot of water extracted*...
> .... "*source control* or maximizing *mass removal* should be considered objectives equivalent to *migration control*"...

EPA presents *migration control* as the primary objective and *mass removal* as a secondary objective of the Baldwin Park OU because the *migration control* objective dictates the size of the remedy (the minimum rate of groundwater extraction in each significant subarea of contamination) and the need to locate extraction wells near the downgradient boundary of each Subarea. This ranking of objectives is consistent with EPA guidance. EPA does not believe that *mass removal* should replace *migration control* as the primary objective, or that additional extraction above that needed for migration control is necessary *in this interim action.* Future remedial actions in the Baldwin Park area may, however, emphasize mass removal (see sections B.3 and B.5 of this response).

Nor does EPA believe that *maximizing mass removal* or *maximizing the mass removed per acre-foot extracted* are appropriate objectives in this interim action, since doing so would conflict with EPA's *migration control* objective (if recommended extraction locations are moved to more highly contaminated areas) or require additional extraction beyond what EPA believes is necessary at present (if additional extraction locations are added).

Proposed Extraction in Subareas 1 and 3 (the *upper* and *lower* areas)

EPA's selected remedy calls for extraction of contaminated groundwater in two portions of the aquifer (two Subareas) where limiting the migration of contaminated groundwater appears to offer the greatest benefit. In the *upper area* (Subarea 1), remedial action can protect downgradient areas from the impact of continuing surface and/or subsurface sources of contamination; in the *lower area* (Subarea 3), remedial action can offer some protection to active water supply wells and less contaminated downgradient portions of the aquifer.

EPA proposed extraction in the *Subarea 1*, at its downgradient end, as a *source control* action to limit the continued movement of contaminant mass to downgradient areas and to remove significant contaminant mass. Virtually all of Subarea 1 is zoned for industrial use. Investigation results from soil, soil vapor, and groundwater sampling at suspected source locations in Subarea 1 confirm the presence of multiple sources of contamination above and most likely beneath the water table. Unless they are removed or contained, high-level contamination in Subarea 1, continually fed by residual sources, will continue to contaminate clean or less contaminated groundwater in downgradient areas, increasing the timeframe for and reducing the likelihood of cleaning up downgradient portions of the aquifer. EPA's strategy is to install and operate extraction wells to provide a barrier that prevents contaminated groundwater from moving out of Subarea 1 into downgradient areas. The selected remedy will *cut off* the sources from downgradient areas.

Contaminant levels in portions of Subarea 1 are in the 1,000s of $\mu g/l$ (parts per billion [ppb]); contaminant levels downgradient of Subarea 1 are in the 100s of ppb.

EPA proposed extraction in the *Subarea 3*, at its downgradient end, to limit the movement of more highly contaminated groundwater into less contaminated downgradient areas and to remove contaminant mass. Benefits of containment include preservation of the resource as a vital water supply and underground storage reservoir, and preventing the spread of contamination toward and beyond the Whittier Narrows. EPA's proposed extraction should also benefit operators of active water supply wells downgradient of Subarea 3 by limiting the impacts of additional contaminant migration on their wells, eliminating the need for wellhead treatment or reducing the operating costs of existing treatment systems by minimizing future increases in contaminant levels. Contaminant levels change from the 10s of ppb in Subarea 3 to near Maximum Contaminant Levels (MCLs) downgradient of the Subarea.

Research and experience at other contaminated groundwater sites indicate that the presence of non aqueous phase contamination or other subsurface sources will have a significant influence on the time frame required for or likelihood of achieving cleanup. If it is confirmed that all or most of the significant sources of the groundwater contamination are present in Subarea 1, then EPA's strategy of containing or cutting off Subarea 1 from downgradient portions of the aquifer will greatly increase the chances of and lessen the time required to clean up downgradient areas.

B.3 Extraction in Subarea 2 (the "middle" area) and Other Possible Extraction Areas

In the FS, EPA also considered the benefits of extracting contaminated groundwater in a third, "middle" area (labeled as Subarea 2). Contaminant concentrations in Subarea 2 are in the 100s of ppb; contaminant concentrations downgradient of this area are in the 10s of ppb. The selected *interim* remedy does not include extraction in this area because additional extraction in Subarea 2 or in additional areas would offer fewer or less certain remedial benefits at considerable added cost. Additional extraction would also require the distribution of greater volumes of treated water, increasing the institutional complexity of the project. EPA will reconsider the merits of additional extraction in Subarea 2 if significant sources of contamination are determined to be present in this Subarea.

If significant sources of contamination are not identified in Subarea 2, then the primary benefit of additional extraction in Subarea 2 would be to more rapidly reduce contaminant concentrations in the Subarea, but by an unknown amount. Our ability to quantify the benefits of additional pumping is limited by uncertainty in the precise extent of contamination, in the relative masses of contamination in different portions of the aquifer, and in the presence of preferential flow pathways and other local-scale aquifer phenomena that affect the time required for clean up. EPA will re-evaluate the merits of additional extraction after the selected remedy is implemented and evaluated. At that time, EPA will be able to calculate rates of contaminant removal, the rate at which contaminant concentrations in the aquifer are decreasing, estimate the timeframe for future decreases and perhaps for complete clean up, and evaluate the costs and benefits of additional extraction.

The selected remedy, or variations of it that include a realistic, finite number of extraction areas will inhibit contaminant migration in certain areas, but not in others. There are probably other locations (in addition to the upper, middle, and lower extraction areas evaluated in the FS) where there are changes in contaminant concentrations that could conceivably warrant groundwater extraction to protect downgradient, less-contaminated portions of the aquifer and remove additional contaminant mass. The extent of contamination in the OU area is simply too large and variable to propose extraction in every individual area where contaminant concentrations may be higher upgradient than downgradient.

B.4 "Approximate Extraction Areas" and "Pumping Configuration"

The preceding section describes the two *approximate extraction areas* (Subareas 1 and 3) in which EPA's selected remedy calls for remedial action. The next two sections describe EPA's recommendations for precise extraction locations and rates in each of the two Subareas. We refer to these recommended extraction rates and locations as *pumping configurations*. The recommended pumping configurations are based on the Subarea boundaries and on computer simulations using EPA's groundwater flow model to identify the most efficient combination of extraction rates and locations that will minimize the movement of contaminated groundwater out of the Subarea. EPA's recommended pumping configurations are not necessarily the only efficient arrangements. Other configurations calling for a greater number of extraction wells but at lower rates, or fewer wells at higher rates, may be equally efficient. See Response C for additional details on EPA modeling efforts.

EPA expects that the pumping configurations described in the ROD will be refined during remedial design after additional monitoring wells are installed and sampled and additional data on hydrogeologic properties of the aquifer are obtained. These data will be used to verify assumptions and refine EPA's interpretation of the lateral and vertical extent of contamination (i.e., the Subarea boundaries), which are used to determine the portions of the aquifer requiring *capture*, which in turn affect the pumping configuration.

Pumping Configuration in Subarea 1

EPA believes that within Subarea 1 there are multiple sources of groundwater contamination, and multiple plumes of contamination separated by less contaminated areas. This interpretation is based on information on the magnitude and duration of chemical usage, handling, and disposal, and on the magnitude, extent, and pattern of contaminant concentrations in soil, soil gas, and groundwater at numerous facilities in the Baldwin Park area. EPA believes that groundwater concentrations at several locations in Subarea 1 reflect the presence of more than one current or historical source. See Figure RS-1. It is likely that additional sources will be identified at additional locations as individual site investigations progress.

To achieve its remedial objectives in light of the presence of multiple sources, EPA considered two differing approaches. The first approach is to install multiple groundwater extraction and treatment facilities, one at or near the facility boundary of each and every significant source. If numerous sources are confirmed, numerous groundwater extraction, treatment, and distribution systems would need to be installed and operated, increasing the total cost and institutional complexity of the remedy. Groundwater extraction and treatment systems may also be needed downgradient of facility boundaries to contain and remove high-level contamination that has migrated some distance from the sources.

Several comments suggest that only the one or two monitoring wells where the highest concentrations have been measured represent sources of groundwater contamination (e.g., W10WOMW1, V10VCMW1) and that the concentrations detected at other wells, including OSCOMW2, Aerojet MW3, and W11AZ03, do not represent sources. We disagree with this interpretation. Groundwater concentrations alone should not be used to determine the presence or absence of a source; other data on chemical usage, soil contamination, and soil gas contamination must also be considered. The lower, but still significant groundwater concentrations measured at wells such as OSCOMW2, Aerojet MW3, and W11AZ03 may reflect differences in the spatial relationship between the well and the original spill or release, or differences in well screen length. A well located at the centerline of a plume will show a higher concentration than a well located at the fringes of the plume, but the exact spatial relationship of most monitoring wells in the Baldwin Park area to the original release is unknown. Also, wells W11AZW01 through W11AZW09 have much longer screen lengths than the Aerojet wells and well W10WOMW1. The screen lengths for wells W11AZW01 through W11AZW09 exceed 200 feet; the screen lengths for the Aerojet wells and well W10WOMW1 are 50 and 30 feet respectively.

The <u>second approach</u> is to install one groundwater extraction and treatment system (which may include more than one well) immediately downgradient of <u>all</u> of the known and suspected sources designed to capture contaminated groundwater originating from all of the sources. The advantages of the second approach are reduced cost and reduced need for investigation work to identify and determine the nature and extent of each source and delineate the boundaries of each resulting plume. Because of the number of suspected sources, the large area across which they are located, and the depth of the contamination, the cost of fully characterizing all potential sources of high-level contamination and delineating separate and distinct areas of contamination in Subarea 1 would be high. Fully characterizing all suspected sources would require a significantly greater number of monitoring wells and other characterization work than has been completed to date to determine both the lateral and vertical extent of contamination. Even with much additional investigation, there is a risk that some high-level contamination or hot spots, especially residual sources, would remain undetected.

A disadvantage of the second approach is that it may allow additional degradation of the interval between the more distant sources and the extraction locations. In the Baldwin Park area, data from well W10WOMW1 indicate the presence of a source adjacent to or upgradient of this well. The distance between well W10WOMW1 and EPA's recommended extraction locations is over 1 mile; the distance between well V10VCMW1 and EPA's recommended extraction locations is greater. The amount or significance of this additional degradation is difficult to measure because too few monitoring wells have been installed to determine the precise distribution of contaminants in this portion of the Subarea.

EPA chose the second approach in its proposed plan. EPA therefore defined Subarea 1 to address much of the industrial area north of Arrow Highway where sources of the groundwater contamination appear to be present and EPA proposed extraction at the downgradient end of the Subarea.

Aerojet, ALR, and OSCO appear, in part, to favor the first approach. They submitted numerous comments on the pumping configuration in Subarea 1 which vary in wording but make the same argument: that EPA should supplement its recommended pumping configuration with additional extraction of contaminated groundwater in the vicinity of well W10WOMW1 (and/or well V10VCMW1) because concentrations of several CVOCs measured in groundwater samples collected from these wells are higher than in downgradient wells. They emphasize that the highest contaminant concentrations measured in the Baldwin Park area are at well W10WOMW1; that EPA's highest priority should be to control these high concentrations; that EPA has ignored the presence of "separate and distinct source areas" in Subarea 1; that EPA should redefine Subarea 1 to include only "small hot spots"; that concentrations in Subarea 1 and 2 are similar except for two small locations where they are *anomolously high;* and that this error or omission will "further degrade aquifer conditions and increase the cost and time necessary [for remediation]."

EPA's response to these comments is that additional extraction in highly contaminated areas beyond that proposed by EPA is beneficial (it would remove additional contaminant mass and increase the ratio of contaminant mass to volume of pumped groundwater), but that it is not necessary to meet the objectives of this interim action. Extraction at W10WOMW1 would not contribute to EPA's objective of limiting the migration of contaminated groundwater out of Subarea 1. And the benefits of addressing one source (e.g., in the vicinity of W10WOMW1) are limited if other significant sources are present, particularly if other sources go unaddressed. If any significant subsurface sources are present, it is uncertain in what timeframe portions of the aquifer impacted by the sources will be cleaned up. If EPA applied this policy consistently and demanded additional extraction at other "hot spots within hot spots," it would greatly increase the cost of the remedy.

In its comments, Aerojet/ALR refer to the additional degradation that would result from failing to address the contamination present at W10WOMW1 closer to its source as causing "further damage to the groundwater resource and increas[ing] the time and cost required for effective remediation." EPA believes that "damage" is a misleading description of this limitation in that it fails to recognize that this area is already highly contaminated and that degradation of the area immediately upgradient of the extraction locations is inherent in all groundwater extraction and treatment remedies. EPA believes that in the absence of significant additional data demonstrating that W10WOMW1 represents the only significant source, an extraction scenario similar to that outlined in the Proposed Plan is the most cost-effective way to address contamination present at W10WOMW1 and elsewhere in Subarea 1, and best balances EPA's "migration control" and mass removal objectives for the OU.

Making Use of the Arrow Highway/Lante Well Cluster in Subarea 1

Aerojet, ALR, and OSCO also submitted comments in their "Addendum to Proposal for Technical Modifications..." that EPA should rely on 4000 gallons per minute (gpm) of extraction at the existing Arrow/Lante cluster to limit the migration of contaminated groundwater from Subarea 1 in place of EPA's recommended Subarea 1 extraction rates and locations. The Arrow/Lante locations are approximately 3/4 mile downgradient of EPA's recommended locations (wells 10 and 13). Moving the extraction locations downgradient, further from known and suspected source locations, would reduce the effectiveness of the remedy by allowing additional degradation of the interval between EPA's recommended extraction locations and the Arrow/Lante well cluster. If, as it now appears, this interval does not include any significant sources of contamination, then moving the extraction locations downgradient would eliminate or indefinitely delay the cleanup of this interval.

Aerjet/ALR have failed to explain the conflict between their suggestion to permit additional degradation of water upgradient of the Arrow/Lante wells and their assertion that EPA's recommended extraction locations in Subarea 1 would result in degradation of the portion of the aquifer between well W10WOMW1 and EPA's recommended extraction locations.

Because the Record of Decision recommends, but does not prescribe, groundwater extraction rates and locations, EPA has not completed a detailed review of the computer modeling or other analyses carried out in support of the proposal to replace EPA's recommended extraction rates and locations with less extraction at the Arrow/Lante well cluster. Commentor is proposing to substitute 4,000 gpm of extraction at Arrow/Lante in place of the 8,500 gpm that EPA's evaluations indicate is necessary. In their submittal, commentor does not identify what differences in hydraulic conductivity, differences in interpretation of the extent of contamination, or other differences justify their assertion that they can extract approximately 50% less groundwater and still satisfy EPA's migration control objective.

Pumping Configuration in Subarea 3

Comments were also received regarding the proposed extraction scenario in the lower area. These comments primarily address the possibility of focusing extraction in the lower area on individual contaminant plumes, rather than on the entire Subarea. EPA may support an extraction scenario that contains and captures individual plumes rather than the entire width of the contaminated area shown in the FS, if additional data become available to more definitively characterize the nature and extent of the multiple plumes that are likely present in Subarea 3. However, given the size of the Subarea and the depth of contamination detected, the data collection efforts (monitoring well installation and sampling) that would be required to adequately characterize all plumes potentially present in the Subarea would probably be cost prohibitive (see Response A for additional detail on the investigations that would be required for this effort). This detailed characterization would not only be extremely expensive and cause undesirable delays in implementation of the migration control action, but the investigation would not likely result in a significantly different project cost (i.e., the total extraction rate required would probably not be substantially reduced).

B.5 When EPA May Support or Propose Additional Extraction

EPA supports additional groundwater extraction and treatment in contaminated areas if consistent with EPA's remedial objectives and shown to not significantly increase the vertical/lateral extent of contamination, as might occur through pumping of wells in relatively clean areas adjacent to more highly contaminated areas or at wells screened deeper than the contamination.

EPA may, in the future, propose additional groundwater extraction in areas other than identified in the selected remedy. EPA may propose additional extraction if additional investigation work indicates the presence of additional sources outside of Subarea 1 and distant from existing extraction and treatment locations, and if there would be significant benefits in protecting the less-contaminated region between the source and the extraction locations. EPA may also propose additional extraction if data collected during design, operation or evaluation of the remedial action indicate that additional extraction would significantly more quickly, or more completely, achieve clean up.

Data that will be collected to evaluate the need for future actions include additional investigation of the lateral and vertical extent of contamination, sampling of groundwater in deeper portions of the aquifer to evaluate the presence of DNAPLs, refined estimates of the total mass of contamination present in the OU area, and the distribution of contamination between the various phases.

BALDWIN PARK OU RESPONSIVENESS SUMMARY

RESPONSE C: EPA MODELING OF GROUNDWATER FLOW IN THE SAN GABRIEL BASIN

This response addresses comments on groundwater modeling provided by the San Gabriel Basin Industry Coalition, Aerojet Gencorp, and Azusa Land Reclamation. Although many of these comments are repeated in several forms in several places, they generally refer to similar issues regarding modeling performed by EPA, both in support of the FS, and indirectly, to all modeling performed by EPA to date. Thus, for simplicity, responses to all of these comments are consolidated below.

In several places, the comments appear to confuse the CFEST computer code with the CFEST model of the San Gabriel Basin prepared by EPA. For clarity, this response assumes that "CFEST code" refers to the generic CFEST software package, whereas the "CFEST model" refers to the set of input parameters and corresponding output of calculated results used to simulate conditions within the San Gabriel Basin. The discussion that follows is divided into an initial section responding to comments on the CFEST code, followed by a section describing EPA's general approach to modeling the San Gabriel Basin. These are followed by a section that specifically addresses comments regarding assumed parameters in the CFEST model of the basin. The last portion of this response describes how the model was used in the Baldwin Park FS.

C.1 CFEST Modeling Software

Numerous comments refer directly to the suitability of the CFEST code for simulating conditions in the San Gabriel Basin. Initial modeling of San Gabriel by EPA was performed using the well-known MODFLOW code (EPA, 1986). However, the MODFLOW model could not accurately reproduce relatively local-scale fluctuations in the water table in response to groundwater pumping, nor could it simulate the migration of contaminants. Given the complex geometry of the basin, and the need to refine portions of the model in the future as more local analysis would require, finite-difference codes were considered generally inadequate. To select a new code and refine this model, EPA undertook an evaluation of available finite-element codes. The selection of codes was based on the following requirements, among others:

1. Ability to represent complex, irregular geometries.

2. Ability to simulate contaminant transport, including the effects of dispersivity, degradation, retardation, and time-varying sources.

3. High-level display capabilities and flexible input requirements that could easily be integrated with a Geographic Information System (GIS) data base.

4. A code in the public domain.

5. A well-known code that had been extensively and successfully verified and benchmarked with widespread acceptance and credibility in the scientific and engineering community.

Using these criteria, the selection was narrowed to three codes available at the time: CFEST, Princeton, and SWIFT II. CFEST was selected because, in addition to meeting the above requirements, it was developed by the U.S. Government, approved for use by the Nuclear Regulatory Commission, and verified and benchmarked as part of one of the most exhaustive international efforts ever undertaken (HYDROCOIN). In addition, because it is used by governments, companies, and academic institutions all over the world, it is widely accepted and its use is well documented in the literature. CFEST is well suited to the simulation of contaminant transport, considers coupled groundwater flow and solute transport (including coupled consideration of density effects), and supports the latest display and graphical technologies available. Proprietary codes have not gained this type of exposure and testing.

C.2 General Approach to San Gabriel Modeling

Regional- and Local-Scale Modeling.

The original version of the CFEST model of the San Gabriel Basin was developed in 1988. As stated in numerous EPA reports, the objective of this model was, and continues to be, primarily the simulation of the regional behavior of the groundwater system. As EPA's focus has moved into specific portions of the basin, including Baldwin Park, this original model has been updated, and most importantly, refined in the areas of interest. In performing these refinements, parameters have been updated to reflect new data as they become available on a local scale. However, given the paucity of detailed information from throughout the aquifer thickness and throughout the extent of these local areas, (e.g., Baldwin Park), the model is still considered to be primarily a regional one, as stated in the Baldwin Park FS Report.

In most cases, current hardware and software technology no longer require development of separate regional- and local-scale models. In the past, the use of direct solvers and the memory limitations of computers dictated the need to develop independent local-scale models with boundary conditions based on the results of regional models. Simulation of local-scale conditions in this manner was limited in that boundary conditions were fixed to the behavior of the regional model, and would generally not vary as a function of changing conditions on a local scale. However, it is no longer infeasible to continue to add local-scale complexity to regional models to refine simulation of local behavior. This is the approach taken by EPA with the San Gabriel model.

Thus, although it is not yet possible to gain a high level of local-scale accuracy in areas like Baldwin Park, it is possible to locally refine the regional model to better simulate the effects of individual wells and recharge on a local scale. This was done in the Baldwin Park portion of the regional model, and as documented in the FS, the three-dimensional simulations reproduce, as a baseline, observed historical conditions. The effects of Santa Fe Spreading Grounds (SFSG) recharge and Baldwin Park area groundwater extraction are clearly reproduced in the modeling figures included in Section 7 of the FS Report. The generally low gradients in the area are also clearly represented in these simulations. Nonetheless, the model does not account for local heterogeneity of aquifer materials.

For example, the alluvial depositional system responsible for the high degree of local variability in grain size and hydraulic conductivity is not completely reflected in the current zonation of hydraulic conductivity and other parameters. It is likely that the pattern of buried river channels has resulted in a complex of braided and meandering stream deposits, overbank deposits, flood basins, levees, and point bar sequences. Evidence of this includes the very high measurements of hydraulic conductivity seen in some aquifer tests. The current model simply attempts to reproduce the regional, composite behavior of the system. The logging and testing of new, deep monitoring wells should allow the system to be somewhat more accurately represented numerically. As remediation proceeds, further fine tuning of the model based on ongoing monitoring from the new well network will allow additional refinement.

Solute Transport Modeling.

EPA acknowledges the complexity of solute transport modeling as highlighted by the comments. The nature of migration of CVOCs in the San Gabriel Basin is a function of the chemistry of the individual contaminants, the physical and chemical nature of the aquifer materials (which is complicated further by its heterogeneity), as well as the hydraulic behavior of the groundwater system. EPA has already attempted to characterize the parameters that define these variables, as documented in the Basinwide Technical Plan (BTP) and Interim San Gabriel Basin Remedial Investigation Report (RI Report) (EPA, 1990 and 1992). An additional variable, perhaps the most difficult to estimate, is the location, timing, and magnitude of the hundreds of historical and ongoing sources of contamination. These include both primary sources at the surface and residual sources in the subsurface.

Given the uncertainty in all of these variables, EPA has never attempted to undertake the simulation of contaminant migration in any but a regional, comparative manner. In the BTP, for example, solute transport was simulated to evaluate the potential effects of *no action* on a basinwide scale, and to comparatively evaluate conceptual alternatives on a local scale. Wherever these simulations are documented, there is substantial explanation of the uncertainty involved and of the comparative (versus absolute) objective of this modeling. The sources of contamination used in this modeling were identified in the course of calibrating simulation results to the available record of contamination in the basin. Unfortunately, the record is limited to data since 1980; it is thus not possible to fully recreate the patterns of migration that have occurred since contamination probably began to be introduced forty to fifty years ago.

In the Baldwin Park area, the uncertainty regarding the nature of contaminant sources is very high. There will never be an exact, complete understanding of the timing, location, and magnitude of the original sources of contamination. The distribution of contamination in groundwater is directly related to the nature of these sources; although much mingling and coalescing of contamination has undoubtedly occurred, individual "slugs" of contaminants clearly continue to migrate through the system. The variability of contaminant concentrations at individual wells results from the effects of these sources, as well as from the effects of pumping and recharge, both artificial and natural. There is also evidence of the presence of non-aqueous phase contamination in the subsurface. This contamination is likely to have migrated as free product, and will continue to behave as ongoing supersaturated sources of contamination in several locations in the subsurface. The current and future extent of contamination in Baldwin Park is, and will be, strongly influenced by the effects of these ongoing residual sources.

Given all this uncertainty, and the virtual fact that it will never be eliminated, EPA does not consider simulation of contaminant transport in the Baldwin Park area to be useful as anything but a tool to evaluate the relative merits of remedial alternatives. Accurate, local-scale predictions of the future nature and extent of contamination can only be approximate estimates. Nonetheless, as explained previously, it should be possible, in time, to use ongoing, detailed data from monitoring wells to better identify locations and magnitudes of residual sources and better approximate the local-scale fate and transport of contaminants.

C.3 The San Gabriel Basin Model

Hydraulic Conductivity

The zones of hydraulic conductivity used in the current CFEST model of the San Gabriel Basin are based on estimates of the areally-averaged nature and behavior of the system. There is no question that individual measurements at wells differ (as they would be expected to) from these areally-averaged values. The issue of the relationship between essentially point measurements of parameters versus the behavior of the system on a larger scale has been extensively studied and documented. Consideration of the effects of scale and the size of the truly representative elemental volume is a large part of the development of conceptual and numerical models of groundwater and other natural systems. In essence, as much data as possible must be considered, in conjunction with the observed behavior of the system, in the definition of parameters. There can be just as much error or uncertainty in relying exclusively on a single data set from a limited number of sampling points, as it is to overly simplify and average spatially-varying parameters.

For the San Gabriel Basin model, months of effort were spent compiling and evaluating data from previous investigations and from wells located throughout the basin. CDWR's previous work in the basin (CDWR, 1966) was considered an outstanding evaluation of the nature of the groundwater system on which to base EPA's initial efforts. The geologic complexity of the aquifer was further evaluated by an analysis of over 700 individual well logs. Estimates of hydraulic conductivity were based on (1) the lithology identified at individual wells, (2) specific capacity tests, and (3) aquifer tests. All of this information was brought together to develop initial estimates of individual zones of hydraulic conductivity, which were then refined throughout the process of calibrating the model. During more recent updates of the model, these initial estimates have been further validated. The fact that individual aquifer tests have yielded values both above and below these estimates is considered further evidence of their relative accuracy.

In the course of reviewing well logs, considerable effort was made to identify layering or any systematic pattern of lithologic variability with depth. The results of this work have been extensively documented (EPA, 1986, and 1992). The apparent consistency of material properties with depth has more recently been verified in some areas (including Baldwin Park) by the detailed geophysical and lithologic data acquired in the course of installing deep monitoring wells. Clearly, in some areas, layering has been established to various degrees; overall, however, there still appears to be only limited lateral continuity associated with individual variations in aquifer materials. The third dimension of the San Gabriel Basin model thus considers no change in lithology and hydraulic conductivity. (The effects of pumping from different depths in the basin is, however, a very important variable that is discretely represented in the third dimension of the numerical model.)

The apparent lack of well-developed layering throughout much of the San Gabriel Basin does not necessarily imply that the system is entirely isotropic. Indeed, anisotropy in the vertical direction can be inferred to exist as a function of the vertical stress. As mentioned above, there may also be a regional anisotropy in hydraulic conductivity in the horizontal plane, given the likelihood of preferential pathways along buried river channels. However, there is no direct evidence of the geometry of these channels, nor of their degree of continuity in one direction over another. Thus, this regional horizontal anisotropy has been accounted for in the shape and location of the various zones of hydraulic conductivity, and a global anisotropy has only been established in the vertical direction. Vertical anisotropy results in a greater resistance to flow in the vertical direction than in the horizontal direction. The adequacy of these assumptions is reflected in the model's calibration.

A wide range of values of anisotropy was experimented with during model development and calibration. The ratio of 1:10

(K_z:$K_{x,y}$) resulted in the best match between simulated and observed conditions. The sensitivity of the model to this parameter was tested by varying this value by orders of magnitude in both directions, and was found to be relatively small (EPA, 1992).

Boundary Conditions

Comments regarding boundary conditions and their effect on simulation of groundwater flow in the Baldwin Park area appear to refer to the manner in which the Sierra Madre and Duarte fault systems are represented rather than to the actual boundaries of the model. As described in the many EPA documents describing this model (e.g., EPA 1986, 1990, 1992, and 1993), the boundaries of the finite-element grid extend to the margins of the alluvial aquifer. These boundaries, depending on their location, are defined by conditions of no flow, prescribed head, or prescribed flux. None of these are near the Baldwin Park area, and do not directly affect flow in that portion of the model. The Duarte fault system lies between the northern boundary of the model and the Baldwin Park area. The Duarte and Sierra Madre systems represent significant boundaries to flow across them, as evidenced by differences of up to several hundred feet in water levels on either side of individual faults. In the San Gabriel model, the effects of these faults are represented by individual rows of elements of low hydraulic conductivity. This discrete representation of the faults is consistent with observed conditions, as evidenced by the model's calibration.

C.4 Baldwin Park FS Modeling

Based on the number of comments received from the Coalition and Aerojet/ALR regarding the San Gabriel Basin CFEST model discussed above, it appears that the readers believe that the modeling performed to date (as described in the FS Report) played a significant role in the development of the Proposed Plan for the Baldwin Park OU. However, for the FS, simulations using the San Gabriel Basin CFEST model had just two primary purposes:

- Modeling was used to estimate preliminary locations and rates of groundwater extraction (the *pumping configuration*) for a remedial action in the OU. These data were needed to evaluate water use and distribution options and to develop cost estimates for the remedial alternatives. As described in the Proposed Plan for the Baldwin Park OU, EPA will verify or refine its preliminary groundwater extraction locations and rates during remedial design, after interpretation of additional data that will be generated during installation and sampling of new groundwater monitoring wells. See Response B for additional discussion of the distinction between *approximate extraction areas* and *pumping configurations*.

- The model was also used to perform particle tracking simulations of the "base case" scenario and the pumping configuration described in the FS Report. The particle tracking simulation, using particles originating from near the Subarea boundaries delineated in the FS Report, verified the remedial effectiveness of the preliminary configuration over an extended period of time (12.75 years). Additional simulations may be required to evaluate the effectiveness of any revised pumping configurations.

Thus, the modeling performed to date for the Baldwin Park OU using the San Gabriel basinwide CFEST model was not a critical element in the development of the ultimate configuration of a remedial action for this OU.

BALDWIN PARK OU RESPONSIVENESS SUMMARY

RESPONSE D: The Role of the Metropolitan Water District of Southern California in the Baldwin Park OU

Several commentors advocated a significant role for the Metropolitan Water District of Southern California (Metropolitan) in the clean up, in some cases asserting that Metropolitan involvement would reduce costs or speed clean up. Some comments expressed disappointment that EPA did not select conjunctive use as its remedy. This response clarifies EPA's position on the role of Metropolitan in its remedy.

D.1 The ROD Allows But Does Not Prescribe Metropolitan Involvement

In its Feasibility Study, EPA evaluates the advantages and limitations of several options for distributing treated groundwater extracted as part of the remedy. The options are: (i) to supply treated water to local water purveyors; (ii) to supply treated water to Metropolitan for export from the San Gabriel Basin; and (iii) to recharge the treated water in existing spreading basins, the San Gabriel River channel, or tributary flood control channels. The FS and Proposed Plan describe pros and cons associated with each water distribution option.

In the Proposed Plan, EPA expresses a preference for supplying treated water to one or a combination of water purveyors in the San Gabriel Valley for distribution to their customers. EPA identifies six purveyors in position to accept treated water, including Metropolitan. The Proposed Plan and ROD do not, however, commit EPA to supply all or part of the treated water to Metropolitan, or to any one or combination of purveyors. The ROD allows treated water to be distributed locally or to be exported from the Basin by Metropolitan depending on the outcome of additional negotiations expected to occur in 1994.

In the ROD, EPA does not commit to supply treated water to Metropolitan due to uncertainty about whether Metropolitan involvement would increase or decrease project cost, and uncertainty whether institutional issues associated with Metropolitan involvement would delay the project. EPA recognizes several potential benefits of Metropolitan involvement including the benefits associated with providing water users throughout Southern California with a new source of water during peak demand periods and Metropolitan expertise in building and operating large water supply projects, but these potential benefits do not, as yet, outweigh potential cost and institutional issues. EPA would enthusiastically support Metropolitan involvement if it is demonstrated that doing so will decrease the cost of the project and reduce institutional barriers.

The impacts of Metropolitan involvement on project cost are discussed further below. Institutional issues associated with Metropolitan involvement are described in the Proposed Plan and Feasibility Study.

D.2 Impact of Metropolitan Involvement on Project Funding

Some comments assert or assume that Metropolitan is prepared to pay a portion of the groundwater clean up costs in the Baldwin Park area, and conclude that a project in which Metropolitan is involved would cost less to EPA or PRPs than one in which they are not involved. EPA does not believe that this conclusion is warranted. Metropolitan staff have indicated the possibility that Metropolitan would contribute to cleanup costs, but to date has committed only to fund "enhancement costs." Enhancement costs are costs in excess of the costs of clean up that would result from Metropolitan imposing more stringent or more costly requirements (e.g., additional pipelines or pumping stations needed to deliver water to Metropolitan's existing facilities, additional treatment costs resulting from imposition of treatment requirements exceeding Federal and State standards).

Metropolitan staff have publicly stated that Metropolitan may be willing to contribute $25 million to a joint EPA/Metropolitan project in the Baldwin Park area. In their written comments, Metropolitan states that "Metropolitan's Board has supported, <u>in concept</u>, providing 25 percent cost sharing for a conjunctive use cleanup project...to cover the water supply benefits resulting from the more stringent drinking water objectives as well as increased surface pumping costs required to convey treated water to Metropolitan's distribution system." Metropolitan and EPA are conducting cost studies to determine how much of the $25 million, if any, would remain after payment of *enhancement costs*. To date, EPA has received no firm commitments from Metropolitan or others for funding of clean up costs.

More than one commentor mentioned the potential for securing outside sources of funding to pay for construction of a project, through the Reclamation Projects Authorization and Adjustment Act of 1992 (P.L. 102-575), which authorizes federal funding of up to 25% for "the design, planning and construction of a conjunctive-use facility designed to improve the water quality in the San Gabriel groundwater basin and allow the utilization of the basin as a water storage facility." In FY94, Congress appropriated $5 million through P.L. 103-126 for this purpose.

It is our understanding, however, that this funding would most likely reduce Metropolitan's contribution and not offset either EPA or Potentially Responsible Party (PRP) funding. EPA is seeking clarification on the use of the funding. We also note that additional appropriations for FY95 and beyond are uncertain.

D.3 Impact of Metropolitan Involvement on Project Size

Some commentors assert that Metropolitan involvement would make it possible to carry out a more extensive clean up. EPA has discussed the potential for Metropolitan or other parties to increase the size of the remedy, but has not received any commitment to do so. EPA will, however, consider any new or more specific commitments before selecting a water distribution option.

D.4 Impact of Project Size on Metropolitan Involvement

Metropolitan has expressed concern that there may be a threshold flow rate below which they are not interested in receiving treated water. In recent discussions, EPA and Metropolitan staff have also examined the potential for a "local conjunctive use" arrangement in which treated water would be supplied to selected local purveyors who are now dependent on imported supplies. Metropolitan may support such arrangements even though they may not involve pumping treated groundwater into Metropolitan's distribution system. Several of the local purveyors identified as potential recipients of treated water in Appendix D of the FS and Proposed Plan could be supplied in a "local conjunctive use" arrangement.

BALDWIN PARK OU RESPONSIVENESS SUMMARY

RESPONSE E: THE FEASIBILITY OF AIR SPARGING/SOIL VAPOR EXTRACTION AT THE BALDWIN PARK OU

EPA received two comments recommending further evaluation of the feasibility of employing air sparging and soil vapor extraction technologies (AS/SVE) for the Baldwin Park OU. As described in the following text, AS/SVE has not been used at a site where the groundwater contamination is as large or deep, or specifically to provide containment of a groundwater plume, leaving significant technical uncertainties regarding the effectiveness of AS/SVE in place of groundwater extraction and treatment at the Baldwin Park OU. Due to these uncertainties, and the cost of resolving these uncertainties, EPA has not selected AS/SVE as a treatment technology for this interim remedy.

E.1 Background

AS/SVE is a relatively new technology in which air is *sparged* (i.e., pumped) into the saturated zone either within or below the contaminated portion of the aquifer. The contaminants are transferred from the aquifer to the vadose zone by stripping or volatilization, and/or transformed or destroyed through enhanced biodegradation. Air and contaminants are subsequently removed from the vadose zone by soil vapor extraction wells, treated, and discharged. To date, air sparging applications have been limited to fairly shallow contamination (typically the upper 30 feet of the water table), in locations near contaminant sources. Air sparging has not previously been applied at a site where the contamination extends as deep as in the Baldwin Park area (450 to 650 feet below ground surface, 200 to 500 feet below the water table). Nor has it been applied across an area as large as the required OU containment areas (up to about 5,000 feet wide). In addition, AS/SVE is not typically used to provide containment of a groundwater plume or plumes, the primary objective of the OU.

E.2 Technical Considerations

The following evaluation of the feasibility of using AS/SVE in the Baldwin Park OU was focused on Subarea 1. Therefore, the discussions that follow describe conditions specifically in Subarea 1 (the upper area) of the Baldwin Park OU, but similar considerations would apply to the use of AS/SVE in Subarea 3 (the lower area). As described below, there are several technical problems associated with using AS/SVE to meet Baldwin

Park OU objectives. These are related to the zone of influence of the air sparging wells, contaminant removal rate, and the impact of air flow patterns.

Zone of Influence

An objective of EPA's remedy is to contain an area of contaminated groundwater in Subarea 1 that is approximately 5,000 feet across. Although specific data on the vertical extent of contamination in this containment area are not yet available, based on downgradient data, it is likely that contamination extends across at least the upper 200 feet of the aquifer. An air sparging well influences a cone-shaped portion of the aquifer that extends from the sparging point up to the water table. The angle of distribution of this cone in coarse gravels is typically about 15 degrees (Nyer, E. and S. Suthersan, 1993). Assuming this angle, along with a well depth of 250 feet below the water table (500 feet total depth), and a well spacing of 50 feet, would yield a radius of influence at the water table of about 67 feet. The cones of influence between adjacent injection wells would overlap, but would still result in an overall zone of influence that does not provide complete coverage of the contaminated area (i.e., a considerable portion of the lower 30 to 40 feet of the contaminated area would not be impacted by sparging). Further, given the developed, urban conditions present across most of the containment area and that there will need to be approximately one SVE well for each injection well, it is not likely that injection wells could be spaced closer than 50 feet apart (this would help close the gap between adjacent cones in the lower portions of the contaminated interval). In fact, even the assumed 50-foot spacing may not be feasible. Thus, the AS/SVE system that could feasibly be installed will not likely be able to remove contaminants across the entire contaminated interval.

Contaminant Removal Rate

A typical AS/SVE system for a fairly aggressive remediation project would attempt to sparge about one pore volume of air into the contaminated zone every three to four days (personal communication, Billings, 1993). Depending on site conditions (type of contaminant, magnitude of contamination, soil characteristics, etc.) this type of exchange rate could potentially achieve clean-up goals in one to several years. Given the injection well characteristics described above (250 feet below the water table and a 67-foot radius of influence), the pore volume in each well's cone of influence is approximately 294,000 ft^3. To inject one pore volume every 4 days would require a flow rate of more than 50 cubic feet per minute (cfm) per well. Although the permeability of the formation in Subarea 1 is quite high, injection rates this large may not be achievable at a single depth. Nested injection zones could help facilitate this high rate, but would actually reduce the pore volume exchange rate in the outer portions of the cone (because shallower injection would not send air out to as large of a radius).

Assuming that the 50 cfm flow rate could be achieved, the system still may not be able to meet the containment objectives for the OU. As stated in the FS Report, a primary objective of this OU is to inhibit migration of contamination into uncontaminated or less-contaminated areas. To achieve this objective, AS/SVE system will have to remove the contamination from the groundwater as it travels through the system's zone of influence. Assuming a radius of influence for each injection well of 67 feet, the total width of the zone of influence is about 134 feet. Groundwater flow rates in this area are typically in the 3 feet/day range, so the travel time through the zone of influence will be approximately 45 days. During this time, only 11 pore volumes will have been sparged (assuming 1 pore volume every 4 days). It is highly questionable whether the AS/SVE system could remove a majority of the contaminants from the groundwater given this total sparging volume.

Air Flow Patterns

Although questions remain regarding the way injected air actually travels through the aquifer, the most widely accepted theory is that the injected air travels vertically through discrete air channels (Nyer, E. and S. Suthersan, 1993). Recent laboratory studies also point towards the discrete channel method of travel being dominant under most conditions, but also indicate that flow of air as discrete bubbles is possible in coarse-grained gravels (Ji et al, 1993). Regardless of the method of travel, there are likely to be areas unaffected by sparging within the zone of influence. If the air is travelling as bubbles, heterogeneities in the subsurface environment are going to divert the bubbles, leaving voids where bubbles do not travel. And, if air travels predominantly in discrete air channels, which are likely quite narrow, there are certain to be significant portions of the zone of influence unaffected by the channeling air flow. Generally, an AS/SVE system should be operated in a pulsed fashion to help minimize the reduction in removal efficiency associated with the formation of permanent air channels. However, in the OU area, pulsing the system will reduce further the number of pore volumes exchanged during the time the contaminated groundwater is flowing through the AS/SVE zone of influence. Thus, for the Baldwin Park OU, either the air channelling or subsurface heterogeneities (by reducing the effective area of sparging) or the pulsed operating scenario (by reducing the number of pore volumes exchanged) will reduce the removal efficiency of the AS/SVE system and limit the ability of an AS/SVE system to provide contaminant containment.

E.3 Cost Comparison

Despite the unfavorable technical considerations for use of AS/SVE in the OU area, EPA has completed a rough, preliminary cost estimate for an assumed AS/SVE system in Subarea 1 of the Baldwin Park OU. This cost estimate is described below and compared to the estimated cost of the pump and treat system for Subarea 1, described in the FS Report.

The AS/SVE system cost estimates are based on data provided in the EPA publication *A Technology Assessment of Soil Vapor Extraction and Air Sparging* (EPA/600/R-92/173, September, 1992) and on cost estimates provided in the FS Report.

Table RS-1 summarizes the air sparging versus pump and treat cost comparison performed for Subarea 1. The costs associated with the groundwater monitoring program are not included in the Table, because the specific vapor and groundwater monitoring program that would need to be implemented for the AS/SVE program was not developed. As shown in the Table, if assumptions made in the comparison hold true, total costs for an AS/SVE system would be less than costs for the pump and treat system proposed.

<u>Pump and Treat Costs</u>

The costs for the pump and treat action in Subarea 1 were taken from the various cost tables provided in Appendix H of the FS Report, primarily Tables H.6-13 and H.6-14 in Appendix H.6, and Appendix H.3 (costs for "Treatment Plant 10 - 8,500 gpm").

<u>Air Sparging</u>

The capital and O&M costs for an AS/SVE system in Subarea 1 have been estimated by assuming the number, depth, and capacity of injection wells as described above: injection wells that are 500 feet deep, with an injection well spacing of 50 feet (100 total injection wells), and an injection rate of 50 cfm/well (5,000 cfm total flow rate). It is assumed that the extraction wells will also be spaced 50 feet apart (100 total extraction wells) and be 200 feet deep. The total extraction rate is assumed to be 6,000 cfm (for an AS/SVE system, the extraction rate must exceed the injection rate).

Wells. Based on previous EPA drilling experience, the extraction and injection well installation cost is assumed to be about $80/foot drilled. Total drilling footage for injection wells is 50,000 feet (500 feet deep times 100 wells) and for extraction wells is 20,000 feet (200 feet deep times 100 wells). This results in a total well installation cost of $5,600,000.

Treatment Facility. The air treatment facility costs are based on the extracted air flow rate of 6,000 cfm. Comparing this air flow rate to the off-gas flow rates developed in the FS indicates that one of the large vapor-phase granular activated carbon units described in the FS Report would be sufficient to treat the extracted air. Other treatment facility costs (based on Appendix H of the FS Report) include an air heater, GAC storage, a small operations building, radiation monitoring equipment, and site work. Based on costs presented in the FS Report, the total cost for this treatment facility is assumed to be $300,000.

Pipelines, Meters, Pump, and Blower. The injected and extracted air pipelines are assumed to be the equivalent of a single 8-inch diameter pipeline. Using similar pipeline costs to those described in the FS Report, the pipelines would cost about $7/diameter-inch/foot. For the 5,000 foot pipeline length, this results in a total pipeline cost of $280,000. The cost of valves and meters is assumed to be $700/well, based on EPA (1992), for a total of $140,000.

The blower (air compressor) required for the assumed AS/SVE system is quite large. The required discharge pressure is at least 150 psi. This is based on a 250-foot head of water (109 psi) and a release pressure of about 50 psi (to overcome frictional losses in the system and the capillary entry resistance to displace the pore water). This release pressure is estimated based on approximately 1 psi for every 5 feet of water depth in coarse gravels (Nyer, E. and S. Suthersan, 1993). Based on a manufacturers' quote, the required compressor would be about 1,000 hp and would cost approximately $385,000, including the electrical and mechanical appurtenances.

The vacuum pump for the SVE wells is sized at 375 hp to provide a flow rate of 6,000 cfm with a 5 psi vacuum. The estimated $70,000 cost for this pump and appurtenances is extrapolated from information provided in EPA, 1992.

Air/water separation equipment is required prior to the treatment facility. Costs for this equipment are about $25,000, based on EPA, 1992.

The total cost for all equipment listed in this category is $900,000.

O&M. The electrical costs for the AS/SVE system are based on similar electrical rates as assumed for the extraction wells in the FS Report ($0.11/kw-hr). The blower and vacuum pump (total of 1,375 hp or 1,030 kw), if operated continuously, will cost approximately $993,000/year. The estimated electrical costs for the treatment facility are $7,200 based on a fraction of the costs presented in Appendix H.3 for Treatment Plant 10.

Treatment facility O&M costs include carbon replacement, off-gas air sampling, natural gas costs and operating labor. Because contaminant concentrations in the extracted air are unknown, carbon replacement cost estimates are based on a percentage of the Treatment Plant 10 carbon replacement costs presented in Appendix H.3 of the FS Report. There are 12 vapor phase granular activated carbon (VGAC) units in the assumed Treatment Plant 10 configuration versus 1 in the AS/SVE system treatment plant, thus, carbon costs for the AS/SVE facility are estimated to be 1/12 of the Treatment Plant 10 costs, or $65,000. Air sampling costs are estimated to be $200/sample and one sample per week (total cost of $10,400).

Natural gas costs, for the air heater, are estimated to be $6,800, 1/6 of the Treatment Plant 10 gas costs. System operating labor, including the treatment plant and all other system components, is estimated at 1.5 hours/day at $35/hour for a total cost of $19,000/year.

The total treatment facility O&M costs are $101,200/year. Annual AS/SVE system maintenance costs are estimated at 2 percent of the construction costs, or $136,000.

E.4 Summary

The potential for cost savings is interesting, but significant uncertainty about the ability of AS/SVE to satisfy the remedial objectives of the Baldwin Park OU, and the cost of reducing the uncertainty, make it inappropriate to select AS/SVE in this interim remedy. Reducing or resolving the technical uncertainties would require additional evaluations of the costs and effectiveness of AS/SVE, including extensive pilot testing to determine operating parameters, evaluate areas of influence, evaluate other measures of effectiveness, and refine cost estimates.

In their written comments, Chemical Waste Management mentioned several apparent advantages of the AS/SVE system over the pump and treat system proposed by EPA. Each of these is addressed below:

- **"Reduced energy expenditures by eliminating groundwater/treated water pumping."** Estimated O&M costs for AS/SVE are less than for pump and treat due to decreased carbon usage, although the total energy expenditures between the two systems are actually fairly similar. As shown in Table RS-1, the electrical costs for the pump and treat system are approximately $400,000/year greater than for the AS/SVE system. However, this does not consider the purveyor reimbursement portion of the pump and treat system. Reduced energy expenditures by the purveyors may offset a large percentage of the $400,000/year difference.

- **"Eliminated capital construction costs of pipelines and distribution facilities to deliver treated water to purveyors and of ex-situ air-stripping towers."** Although it is correct that all of the listed facilities will be eliminated, it should also be noted that considerable additional capital construction costs will be required to install the 200 AS/SVE system wells (compared to the three extraction wells needed in the pump and treat system).

- **"Eliminate potential need for scarce recharge capacity in the winter months."** As described in the Proposed Plan, the preferred distribution alternative for this action is to deliver the treated water to purveyors for local use. In this scenario, the additional recharge capacity required would be minimal. In addition, as described in the FS Report, during most periods (including winter) there should be adequate excess recharge capacity available in the area to accept treated water.

- **"Shortened remediation time frame over typical groundwater pump and treat systems."** AS/SVE has been shown to shorten remediation time in many existing cases, but these applications are typically in source areas with shallow contamination. In the OU area, the AS/SVE system would be used to contain contamination originating from multiple sources, but the sparging wells would be distant from the residual sources. Unless additional AS/SVE systems are implemented at each source, the use of AS/SVE would not likely shorten remediation time. In fact, as described above, the AS/SVE system may not be able to remove the contamination from the water that passes through the system's zone of influence.

References for Response E:

Ji, Wei, et al. *Laboratory Study of Air Sparging: Air Flow Visualization*. Groundwater Monitoring and Remediation, Volume 13, No. 4. Fall 1993.

Nyer, Evan K. and Suthan S. Sutheran. *Air Sparging: Savior of Ground Water Remediations or just Blowing Bubbles in the Bath Tub?*. Groundwater Monitoring and Remediation, Volume 13, No. 4. Fall 1993.

U.S. Environmental Protection Agency. *A Technology Assessment of Soil Vapor Extraction and Air Sparging*. EPA/600/R-92/173. September 1992.

Personal Communications

Billings, Gale. Billings and Associates. December 1993.

BALDWIN PARK OU RESPONSIVENESS SUMMARY

<u>RESPONSE F</u>: ARE THE DATA AND TECHNICAL ANALYSES OBTAINED AND COMPLETED AS PART OF THE BALDWIN PARK OU FEASIBILITY STUDY ADEQUATE TO SUPPORT THE SELECTION OF A REMEDY?

In their joint submittal, Aerojet Gencorp (Aerojet) and Azusa Land Reclamation (ALR) make numerous comments about the adequacy of the data collection and analysis efforts completed as part of the Baldwin Park FS. Some of these comments offer specific criticisms. Dozens of other comments simply repeat claims that EPA's data collection and analysis efforts are inadequate without offering any specific criticisms. This response summarizes most of the specific criticisms and identifies the location of EPA's response. We do not respond to the dozens of claims that are not accompanied by specific criticisms.

F.1 EPA Believes That Data are Adequate to Support the Selection of Remedy

EPA strongly believes that the water quality, hydrogeologic, and other data collected and analyzed as part of the Baldwin Park FS are adequate to support the selection of a remedy. During the RI/FS, EPA deliberately carried out the minimum amount of site characterization work needed to support remedy selection, deferring to the time of remedial design some sampling and analysis work that could have been, and at other Superfund Sites often is, completed prior to remedy selection. The Baldwin Park RI/FS included sampling and analysis efforts by EPA, water companies, the Main San Gabriel Basin Watermaster, individual businesses and property owners, and others over the past 10 years. See Section 3 of the FS for a description of RI efforts, and Section 2.2 of the ROD for a list of EPA documents summarizing RI work in the Baldwin Park area.

During the Baldwin Park RI/FS, EPA believes that it collected and analyzed data adequate to:

- justify the need for remedial action in the Baldwin Park area;
- specify remedial action objectives;
- specify approximate extraction areas;
- suggest preliminary extraction rates and locations (and allow modifications to these rates and locations if additional analyses warrant a change);
- identify the least costly treatment technologies capable of removing contaminants from groundwater and achieving treatment goals;

- identify alternative pipeline alignments and potential recipients of the treated water; and
- estimate project costs consistent with EPA guidelines.

In our response to specific Aerojet/ALR comments on the Baldwin Park Feasibility Study (elsewhere in this Responsiveness Summary), we respond to and in many cases rebut specific criticisms asserting errors or omissions in EPA's data collection or analysis efforts. In other cases, we agree with comments that point out the need for additional data collection and analysis to support the <u>design</u> of the remedy (as opposed to the selection of the remedy). The following table summarizes many of the specific criticisms that EPA's data collection and analysis efforts are inadequate and identifies the location of EPA's response.

SPECIFIC COMMENTS THAT DATA COLLECTION OR ANALYSIS EFFORTS ARE INADEQUATE	**RESPONSE**
EPA's proposal does not address a portion of the aquifer exhibiting the highest concentrations of chemicals in groundwater (in the vicinity of well #W10WOMW1).	EPA's remedy does address contamination at well #W10WOMW1. See Response B
Plumes in Subarea 3 have *stabilized* or *reached equilibrium*, and additional study is needed to justify remedial action in Subarea 3	The preponderance of evidence indicate otherwise. See Response A.
EPA's modeling efforts, using the CFEST model, did not or cannot account for "baseline" conditions (e.g., effects of production wells/pumping, recharge at Santa Fe Spreading Grounds, other local-scale details) and are therefore "invalid" and "technically inappropriate."	EPA's modeling does account for baseline conditions. See response to comments Aj#143, Aj#144, and Response C.
EPA did not examine the potential remedial effects of recharge, and did not consider the effects of existing wells/wellhead treatment. "High volumes of recharge at the SFSG and/or ISG resulting from the alternatives presented in the OUFS could further negatively impact a poorly developed remedial action..."	EPA did evaluate the impacts of recharge and consider the effects of existing wells/wellhead treatment. See responses to comments Aj#145 and Aj#179.

Recharge at the SFSG changes the groundwater flow direction from southwesterly to easterly, not "more southerly toward the recommended OU extraction locations" as stated by EPA.	EPA apologizes for an editing error. See response to comment Aj#181.
"On the basis of the very sketchy information regarding the use of aquifer recharge as an independent general response action in the OUFS, it is apparent that EPA has not conducted a complete technical evaluation of remedial alternative options..."	EPA did evaluate the impacts of aquifer recharge. See responses to comments Aj#145 and Aj#179.
The CFEST model is not sufficiently calibrated on a localized scale to provide the degree of detail necessary for evaluating OU alternatives. ...[F]ailure to recognize such deficiencies of the CFEST model will result in technically limited simulation results if applied to localized OU scale decisions."	We disagree. See response to Aj#143 and Response C.
"EPA's statement that "computer simulations do not indicate that the choice of water use option results in a significant difference in remedial effectiveness" demonstrates EPA's limited evaluation of remedial alternatives considered for the *BP OUFS*."	We disagree. See responses to Aj#179 and 190.
No data exists on the vertical distribution of contamination in Subarea 1.	Data on the vertical extent of contamination are sufficient to select a remedy, although additional data are needed for design. See response to Aj#58.

There is only one monitoring well in Subarea 2 and no monitoring wells in Subarea 3. Remedial action in Subarea 3 is based on "an almost total absence of characterization information"	Data from production wells in and down-gradient of Subareas 2 and 3 are adequate to specify a remedy. Additional monitoring wells will be installed during the time of remedial design. See response to comment Aj#14.
"A contaminant mass balance/transport analysis ...is needed to determine whether further remedial measures are required [in] Subarea 3."	Mass balance/transport analysis is not needed to justify action. See Responses A and C.
EPA's proposed remedy will allow more highly contaminated groundwater located north of the 210 freeway to spread into less contaminated areas.	Movement of more highly contaminated groundwater into less contaminated areas is a limitation in the cleanup of large areas of groundwater contamination. See Response B.
EPA failed to complete a Remedial Investigation.	This claim is without merit. See response to Aj#259

F.2 Additional Data Collection and Analyses are Needed During the Time of Remedial Design

There is an important difference in purpose between the ROD and remedial design phases of the Superfund process. The ROD specifies the general nature of the remedy, but does not, and should not, specify project design details. EPA regulations state that the Record of Decision should identify and summarize the major "technical aspects of the selected remedy that are later refined into design specifications" in the remedial design phase of the Superfund process. EPA guidance advises that the ROD should be limited to describing "major treatment components" and "engineering controls" that will be part of the remedy, as well as any "performance standard that the remedial action is expected to achieve."

Completing investigation work pre-ROD to specify design details, and specifying design details in the ROD, is neither legally required nor sensible. The time lag between completion of the ROD and completion of remedial design for a project the size of the Baldwin Park OU remedy is typically 12 to 24 months. Design-related investigation work completed pre-ROD may prove obsolete by the time the design is prepared, minimizing its value. Completing work pre-ROD that may need to be redone post-ROD would be inconsistent with good engineering judgment and common sense.

Nor does it make sense to "lock in" project details in a ROD when additional data collected post-ROD may suggest refinements to those details. If EPA specified a design detail in the ROD such as which of the several potential recipients will receive treated groundwater from the remedy, implementation of the project could be delayed if data or discussions post-ROD suggest it would be cheaper or quicker to supply water to a different recipient.

F.3 EPA Record of Decision for the Baldwin Park OU Includes Recommendations for Additional Data Collection and Analyses During the Time of Remedial Design

As described in the Baldwin Park Feasibility Study, Proposed Plan, and elsewhere in this Responsiveness Summary, EPA believes that additional data collection is required during the time of remedial design. The FS includes recommendations for a monitoring program to be completed as the first step during the time of remedial design; this Responsiveness includes revised recommendations. See response to comment Aj#58.

......INDIVIDUALS AND INTEREST GROUPS...

I. Comments by Allan Hill (AH)

AH#1. Commentor notes that the FS states that the 29,000 gpm (rather than 19,000 gpm) extraction scenario appears to be the "optimum scenario" for use with the remedial alternatives (page 7-12). He asks for documentation that a 19,000-gpm project stops migration of the contamination and further explanation why EPA proposed a 19,000-gpm plan.

EPA Response: Section 7 identifies three *Subareas* of groundwater contamination in which remedial action *may* be warranted. Section 7 also includes a statement that extraction of 29,000 gpm is "optimum" if the goal is to limit the migration of contaminated groundwater in all three Subareas (and if modeling assumptions remain valid). (The "optimal" rate for extraction in two Subareas is 19,000 gpm.) In this statement, EPA did not intend to imply that extraction in the three Subareas is necessarily the *optimum* remedy.

In subsequent evaluations, described in Sections 11 and 12 and in Response B included in this Responsiveness Summary, EPA compared the advantages and limitations of extracting and treating contaminated groundwater in two, three, or greater than three Subareas. EPA concluded that remedial action in two Subareas was the best option because it offered significant and relatively certain benefits, will significantly limit the migration of contaminated groundwater in and beyond the Baldwin Park area, will remove significant amounts of contaminant mass, appears to be implementable, and is technically defensible. This Alternative was presented in EPA's Proposed Plan and selected in this Record of Decision. We have prepared and included as Response B a detailed explanation of the benefits and limitations of EPA's remedy. We do not repeat that discussion here, but instead refer the reader to Response B of this Responsiveness Summary.

We see, in hindsight, that EPA's decision to propose and select the smaller of the remedies evaluated in the Feasibility Study, and the use of the word *optimal* to describe the pumping configuration of the larger remedy, has left some reviewers with the impression that the selected remedy is less than adequate. We hope that the explanation offered in this response and in Response B better explains the rationale for EPA's decision.

AH#2. Commentor suggests that EPA proposed the 19,000 gpm project to satisfy "the Watermaster group." Commentor writes: "I understand the watermaster group believes they can only dispose of 19,000 gpm within the adjudicated area. Thus to avoid the question of export they will agree to switch from

using wells that yield that much from the clean areas of the valley to accept only that amount of processed water from wells within the contamination zone. I have the understanding this is the fix that watermaster hopes to use to prevent Conjunctive Use by Metropolitan or any other group from outside the adjudicated area. There are areas in the watershed of the San Gabriel River that must depend upon imported water today that would be logical users of 10,000 gpm of processed water from the operable unit. A good example is Puente Valley."

<u>EPA Response</u>: Commentor is incorrect in assuming that EPA developed its proposal primarily to satisfy the Main San Gabriel Basin Watermaster, local water purveyors, or other local interests. EPA has consulted extensively with local agencies, purveyors, and interest groups, but the decision to propose approximately 19,000 gpm of extraction represents current EPA policy emphasizing containment, experience gained at numerous other groundwater sites about the capabilities and limitations of "pump and treat" technology, and the distribution of contaminated groundwater in the Baldwin Park area. See Response B for a more detailed explanation of the rationale behind EPA's proposed pumping configuration.

Potential recipients of treated water include users that would be supplied through export, in the Puente Valley and elsewhere. See section 9 and appendix D for a list of potential recipients, and an evaluation of the feasibility of supplying treated water to users in the Puente Valley and other portions of the San Gabriel Basin.

AH#3. Commentor requests that "EPA adopt a two phase implementation of the 29,000 gpm extraction scenario where the first phase would be the 19,000 gpm to be utilized by the watermaster group. The second phase would be a 10,000 gpm scenario that would be water for export by any group other than the existing local pumpers. It could be part of a much larger conjunctive use project or the existing cyclic storage program of Three valleys M.W.D. or Metropolitan Water District. If the institutional problems of the adjudication provision preventing new exports could not be overcome, the 10,000 gpm of processed water could be discharged into the river for capture by existing downstream facilities and eventual use by the cities downstream of the watermaster extractors service areas. The watermaster has such an arrangement with the industrial firms cleaning up contamination in Puente Valley."

<u>EPA Response</u>: Commentor raises three issues: the size of the remedy, the recipients of treated water from the remedy, and the potential for future EPA projects after implementation of the selected remedy.

See AH#1 and Response B for additional discussion of the size of the selected remedy. See Section 9 for a discussion of water use options, including the feasibility of discharging water into the river or other surface water channels. We note that any significant discharge of water into surface water channels must consider the requirements and implementation history of the Long

Beach Judgment. The Long Beach Judgment declares that users downstream of the San Gabriel Basin (the "Upper Area" defined in the Judgment) are entitled to an annual average of 98,415 acre-feet of "usable water." The majority of this entitlement has, however, been supplied historically through "natural" surface and subsurface flow (resulting from precipitation and to a lesser extent, discharge of treated sewage effluent). A minority of the entitlement, termed "make-up water," has been met through the purchase and transfer of imported water. Between the 1979-80 and 1991-92 water years, users in the San Gabriel Basin supplied an average of 8,213 acre-feet of make-up water to downstream users. The range in this period was 0 to 28,279 acre-feet/year. See Twenty-ninth Annual Report of the San Gabriel River Watermaster for 1991-92, City of Long Beach, et al., vs. San Gabriel Valley Water Co., et al., Case No. 722647 - Los Angeles County.

There is the potential for future EPA projects in the Baldwin Park area. EPA's selected remedy is an "interim action" that may be supplemented or modified if information collected during implementation of the project indicates the need for additional groundwater extraction. EPA's project includes a comprehensive groundwater monitoring program (see response to comment Aj#58) that will generate data to evaluate the project's effectiveness.

II. Comments by Alton J. Amdahl

The comments submitted by Alton J. Amdahl are identical to comments submitted by Allan Hill. See comments AH#1 to AH#3 and EPA responses.

III. Comments by Bill Robinson (BR)

BR#1a. "I cannot support EPA's proposed interim "containment" project Option #1." "Recommendation: Option #3 Large Scale 29,000 GPM Conjunctive Use Alternative combined with clean-up and regional export."

EPA Response: Comments noted.

BR#1b. "EPA must exert heavier influence to force a compromise between local and regional interests, rather than follow the local lead by accepting institutional problems and locally inspired doubts about water end use as a permanent obstacle to clean up of the basin. "Containment" options are of little worth to the public, but allows local purveyors, utilities who already monopolize the management of the basin, to monopolize the EPA clean up by

pushing their containment option #1. The basin is a public resource not a private lake (reservoir)."

<u>EPA Response</u>: We disagree with commentor that EPA's Proposed Plan is "of little worth to the public," that the clean up is "monopolized" by local interests, or that "water end use is a permanent obstacle to clean up." The decision to emphasize containment and mass removal reflects current EPA policy and the experience gained at sites with groundwater contamination throughout the country. See response to AH#2 and Response B, which further describe the rationale behind EPA's proposal.

BR#2. "Economics of scale and the stark reality of permanent water shortages in So. California in the next decades argue that all clean water produced by the largest cleanup plant EPA can build will soon find a beneficial end use. The water industry routinely uses paper trades and credits to even out the peaks and valleys of annual water usage. These techniques can be applied to water produced to keep a large scale plant operating 12 months per year at full capacity. The EPA goal should be both to enhance common local routine cyclic storage (put and take) programs together with increased regional export opportunities."

<u>EPA Response</u>: We agree that there is no fundamental reason that 19,000 gpm, 29,000 gpm, or greater amounts of water could not be put to a beneficial end use. We wish to correct any misconception that difficulties in distributing treated water are the primary factor considered in determining the size of EPA's proposal. The primary considerations are technical, as discussed in AH#1 and 2, and Response B.

We agree that "paper trades" may help in the distribution of water from EPA's proposed project. EPA representatives have met with water purveyors in the Baldwin Park area and the Main San Gabriel Basin Watermaster to discuss possible trades, and will continue discussions in the hope of reaching agreements to distribute water from EPA's proposed project.

EPA's responsibility is to develop and implement remedial actions needed for cleanup. EPA supports improvements in the use of San Gabriel Basin's water resources, as long as it does not increase the cost of or interfere with cleanup.

BR#3. "The most likely problem that could defeat the conjunctive use option or <u>any</u> option is not understanding the width, length and depth and direction of movement of the plume and miss-siting the plant or not designing enough flexibility of plant/flexibility of contaminated water feeder pipe to keep the facility supplied with contaminated water during its entire productive life. Facility siting decisions must be based upon thorough programs of water testing, analysis and flow modeling. <u>These programs must be controlled by Public agencies</u> guided by public interest goals not private monopolized local agencies with non public interest axes to grind. Locally, well testing is controlled by the Alhambra judgement Watermaster, an arm of L.A.'s Superior Court, an agency realistically controlled by the five largest water utilities existent in the basin, an organization with apparently enough influence to

drive the proposed projects to the detriment of the public interest, i.e. a cleaner basin."

<u>EPA Response</u>: We agree that extraction locations should be based on "water testing, analysis, and flow modeling." EPA will consult with local agencies and others, public and private, interested in and affected by the contamination and EPA's selected remedy, but EPA will remain responsible for making final decisions on extraction locations and other project details.

BR#4. "EPA authority can overcome opposition of the local water purveyor monopoly if EPA properly sites a facility, then exports part of the excess production from a proposed 29,000 GPM "Clean up" operable unit. Export rules under the Long Beach judgement River Watermaster has been routine in the basin transferring to Central basin currently 85,000 A.F. a year in orderly, stable and long-institutionalized fashion. The local monopoly interest has been blowing smoke at EPA apparently increasing EPA's export anxiety in order to selfishly maintain their nearly total control over the water resources of the valley."

<u>EPA Response</u>: EPA disagrees that its "export anxiety" exceeds its level of anxiety about any other distribution options. EPA will select the distribution option that meets its remedial objectives and to the extent feasible, minimizes cost, minimizes institutional barriers that might delay or preclude implementation, and satisfies State and local preferences.

We note that most of the 85,000 acre-feet (af)/yr of water supplied to downstream users in the central basin to meet obligations of the Long Beach Judgment has been met by natural subsurface and surface flow. The increment actually purchased to meet obligations of the Judgment ("Make-up Water") has averaged 8,213 acre-feet over the last twelve years. Also see response to AH#3.

BR#5. "The San Gabriel Valley contains nearly all built out communities with limited, well understood, stable demands for water. Demand increases about 1 percent per year. The proposed interim-containment solution - damages the public interest by delaying cleanup while furthering the private interest control of the public basin resources. EPA funds and all public funds must serve public health and safety, which demands the quickest feasible cleanup solution. The S.G. basin as the "private lake" scenario can be subordinated to an improved proposal; a dual purpose approach that allows: 1. protection for local water interest for the beneficial use of water of the basin and; 2. the regional beneficial interest through orderly planned exports of produced excesses.

The past decades have brought broad benefits through the provisions of the Long Beach judgement (see comment #4). Future wider opportunities and benefits to the region may occur through support and sponsorship of EPA Superfund. Metropolitan Water District and Federal Bureau of Reclamation funding and federal legislation sponsorship of Cong. E. Torres."

EPA Response: EPA's proposal does not delay cleanup; it represents the most significant step toward clean up made to date. Nor does it represent any shift in control from public to private interests. Also see responses to comments BR#1-4.

BR#6. "The EPA proposed solution option 1 damages the public interest by not providing for opportunities for regional beneficial interest, hobbles the clean up goal, and loses the project possible funding from Metropolitan Water District, Bureau of Reclamation, Three Valleys Municipal Water District and Central Basin Municipal Water District."

EPA Response: This comment largely duplicates comments 1-5. EPA is unclear how its proposal "loses ... possible funding" from Metropolitan or others. EPA has received no firm commitments from any of these agencies for funding of clean up costs. Nor has EPA ruled out or in any way limited the possible involvement of Metropolitan or others. Distributing water to Metropolitan remains an option if it is demonstrated that supplying water to Metropolitan will increase the extent of clean up, lessen costs, speed implementation, or otherwise benefit clean up. There may be benefits if Metropolitan is involved, but at present, it is unclear if Metropolitan involvement would provide a net benefit. Also see response to Tor#1 and Response D.

BR#7. Large scale conjunctive use better serves both the local interest, because more contaminated water is cleaned up and removed faster, and enhances the regional interest through increased water supply from export. The export under option #3 also includes preferred smaller $200-$300 per A.F. clean up costs. The large project option optimizes per A.F. clean up costs, while small scale projects options almost double treatment costs. The small projects only discernable advantage: it maintains the control of the local parochial interests of the water purveyor cartel. S.G. basin exports already occur annually through Whittier narrows in an orderly institutionalized fashion to Central Basin by pipelines, underground and occasional surface flows.

EPA Response: This comment largely duplicates comments BR#1-6. We agree that larger projects could limit migration of contaminated groundwater in additional areas and increase the amount of contamination removed, but again note that the size of the project has been determined based primarily on technical considerations, as discussed in AH#1 and AH#2, and Response B.

IV. Comments by the East Valleys Organization, Toxics Task Force (EVO)

EVO#1. Commentor "supports the plan, but [does] not think that it goes far enough." Views EPA's proposal as overly cautious "at a time when bold action and imaginative solutions are required..." Expresses understanding of "concerns by some in the local water community of losing authority to MWD," but believes that "a greater threat has come from the opposite tendency: a balkanized political structure and a parochialism

in attitudes that have hampered decisive action and a comprehensive approach to the wise use of scarce resources."

EPA Response: Comments noted. EPA does not view its proposal, whose estimated "30 year present value" exceeds $100 million, as a "cautious" or "unimaginative" step in the cleanup. See Response B for a more detailed discussion of EPA's rationale for the scope of its remedy.

EVO#2. Recommends that "EPA should support conjunctive use with the Metropolitan Water District ... to make it possible to carry out a more extensive clean up, ... help ensure Federal Bureau of Reclamation and MWD participation in funding for the facility, [and to make] the San Gabriel Basin aquifer ... [a] resource that will help all of Southern California cope with its critical water management problems."

EPA Response: EPA remains interested in increasing the involvement of Metropolitan Water District if it is demonstrated that Metropolitan's involvement would increase the extent of clean up, lessen costs, speed implementation, or otherwise benefit clean up. At present, it is unclear if Metropolitan involvement would provide these benefits. See response to Tor#1 and Response D.

V. Comments by Friends of San Gabriel River (FSG)

FSG#1. Commentor [does] "not agree the proposed project of extraction of 19,000 gpm at Baldwin Park Operable Unit will achieve the objective of compliance with the requirements of federal law." Commentor recommends that EPA adopt Alternative 3 (described in the Proposed Plan), favoring extraction of 29,000 gpm (rather than 19,000 gpm) and involvement of Metropolitan Water District of Southern California. Commentor asserts that extracting 29,000 gpm would speed clean up, reduce costs, allow EPA's remedial objectives "to be achieved before the first effects of a 19,000 gpm program could even be detected," [and that] "it is the duty of EPA to achieve as much cleanup as those who are involved will finance on there [sic] own."

EPA Response: As stated in the Proposed Plan and the ROD, EPA believes that its selected remedy, calling for extraction and treatment of approximately 19,000 gpm of contaminated groundwater, satisfies the statutory requirements of Section 121 of the Superfund law and best satisfies the Superfund evaluation criteria. The remedy is protective of human health and the environment, cost-effective, complies with all applicable or relevant and appropriate requirements, utilizes permanent solutions to the maximum extent practicable, and satisfies the statutory preference for treatment.

Commentor's assertion that extracting 29,000 gpm would allow EPA's remedial objectives "to be achieved before the first effects of a 19,000 gpm program could even be detected" is unfounded. See Response B for a detailed discussion of EPA's rationale for proposing extraction of approximately 19,000 gpm, rather than 29,000 gpm, of contaminated groundwater.

It would be senseless and irresponsible for EPA to determine extraction rates based on the ability of EPA or others to fund the project, as commentor suggests, rather than on technical analyses.
See Response B for a discussion of the rationale for the size of the selected remedy and Response D for a discussion of the role of Metropolitan Water District.

FSG#2. Commentor believes that treated groundwater that is not distributed to water purveyors could be piped to spreading basins and flood control channels, eliminating the risk that extraction of contaminated groundwater would need to cease due to inadequate demand by water company customers.

EPA Response: Recharging treated groundwater remains an option in the Record of Decision. Recharge is not specified as the *only* acceptable method of water distribution or disposal due to its potential disadvantages, which include inadequate spreading basin capacity, and loss of usable water to the Central Basin. See Section 9 and the response to comment AH#3 for a more detailed discussion of the limitations and disadvantages of recharge.

FSG#3. Commentor also advises that EPA "include conjunctive use by not only Metropolitan Water District but by any other group that will supply financing."

EPA Response: EPA's plan allows for the supply of treated groundwater to purveyors now dependent on supplemental sources of water, which may result in increased conjunctive use of local and imported water resources.

VI. Comments by Rayall Brown [presumed to be Royall Brown] (RB)

RB#1. Commentor found the microfilm version of the Administrative Record at the West Covina Library "unreviewable." Commentor believed that the library's viewing equipment could only handle 35 mm film, rather than the 16 mm format used to microfilm the Administrative Record.

EPA Response: We regret the difficulty which the commentor had in reviewing the microfilmed version of the Administrative Record. The commentor's difficulty may have resulted from his unfamiliarity with the microfilm reader.

Commentor first informed EPA staff of his difficulty in reviewing the microfilm (located at the West Covina Public Library) at an EPA public meeting held on 5/20/93. After the meeting, EPA staff contacted Mr. Bruce Guter, the documents librarian. Mr. Guter viewed the microfilm, including a frame identified by the commentor as unreadable (film 4, frame 1710). Mr. Guter had no problem reading it. Mr. Guter noted that there are two different lenses available - one for regular format documents and the other for maps and other oversized documents. Commentor may have used the wrong lens. We are confident of library staff's willingness to help any members of the public having difficulty reviewing the Administrative Record; we have found staff at the West Covina Public Library extremely cooperative. No other commentor has expressed any problem in reading the microfilm; to EPA or, as far as the head librarian knows, to library staff.

At the public meeting, EPA staff offered to place a paper copy of the Baldwin Park Feasibility Study at the library to facilitate its review. (The Feasibility study was the document of greatest interest.) The Feasibility Study was mailed to the library on May 25th, 1993.

RB#2. Commentor identifies several wells between the San Bernardino Freeway (I-10) and the railroad tracks along Valley Blvd where contaminant levels have exceeded MCLs. Commentor notes that the Proposed Plan does not address contamination at these wells, and that contamination south of the freeway will continue to spread. Commentor concludes that the proposed project will not meet EPA's migration control objectives.

EPA Response: We agree that there is contaminated groundwater downgradient of the proposed extraction in the "lower area." We make this observation on page 7-5:

> "Contamination has been detected downgradient of Subarea 3 [the lower area] at concentrations at or near MCLs ..."

The comment highlights an important limitation of EPA's proposal. No realistic cleanup proposal can completely stop migration of all contaminated groundwater across an area as large as the Baldwin Park area; any proposal that includes a realistic, finite number of extraction locations will limit migration in some areas but not in others. If the proposed extraction locations were moved some distance south to address lower levels of contamination, more highly contaminated groundwater upgradient of the extraction locations would migrate unimpeded. As discussed in greater detail in Response B, EPA believes that its proposal best meets its remedial objectives by limiting migration and removing contaminant mass from areas in which remediation will provide the greatest benefit.

Finally, we note that EPA's proposed project is an *interim action* which may be supplemented in the future.

RB#3. Commentor notes that a treatment facility has been installed by La Puente Valley County Water District at wells listed for potential shutdown in the FS, Table 7-3. Commentor recommends that this and other treatment facilities continue to operate as long as the wells served by the equipment show contamination, pointing out that it would "not be economical" to discontinue the use of installed clean up facilities in order to build other facilities.

EPA Response: EPA is aware of the installation and operation of a treatment facility at the La Puente Valley County Water District's wells. Water quality data available through 1992 indicate that groundwater at the District's wells is less contaminated than groundwater at the Big Dalton well and other locations to the north. EPA included the District's wells in a list of "Wells for Potential Shutdown or Reduced Extraction" as a reflection of our preference that extraction in clean or less contaminated areas be minimized. EPA recognizes, however, the District's need to extract water to meet its water supply responsibilities.

EPA has no plans to limit operation of the District's wells or treatment facility.

RB#4. Commentor notes that: "...the Feasibility Study indicates the "optimum" extraction scenario is 29,000 gpm at specific areas and if other wells are used a larger amount needs to be extracted to stop the spread of contamination. Currently at two well fields south of the I-10 freeway the San Gabriel Water Company also has installed treatment facilities. The use of the clean up equipment south of the freeway indicates a major problem. At present there are more wells south of the freeway connected to clean up facilities than there are in the Baldwin Park Operable Unit north of the freeway. The Interim Plan needs to be altered to reflect the existence of installed clean up facilities south of the freeway. As a result I request the EPA adopt an interim plan that extracts 29,000 gpm or more from wells in the Baldwin Park Operable Unit."

<u>EPA Response</u>: EPA acknowledges the existence of several existing and planned treatment facilities. The extent to which continued operation of any of the existing facilities will satisfy EPA's remedial objectives will be determined during the design phase of the project, making use of the most up-to-date water quality data. See response to comment AH#1 and Response B for a detailed description of EPA's rationale for proposing extraction of 19,000 gpm of contaminated groundwater, rather than 29,000 gpm.

RB#5. Commentor "oppose[s] the recommended plan of 19,000 gpm extraction as it does not reflect the infrastructure of the San Gabriel River Basin." Commentor reports that an undated San Gabriel River Watermaster Annual Report shows the lower area with an annual entitlement of 85,600 Acre Feet of water from the upper area, and that 10,000 gpm continuous pumping equals 16,133 Acre feet per year. Commentor concludes: "Thus if 10,000 gpm of the 29,000 gpm under alternatives 2 or 3 was discharged down the drainage system, the lower area could capture it and it would become groundwater in the lower basin. It could in future years be part of the usable water documented annually by the river watermaster. As a result, ..., the infrastructure exists to dispose of all of the 29,000 gpm extraction alternative without utilizing any of the existing local pumpers efforts that only can dispose of 19,000 gpm."

<u>EPA Response</u>: In the Proposed Plan, EPA expresses a preference that treated groundwater be distributed to water purveyors for direct use, but includes recharge as a backup water use option in case agreements to distribute water to purveyors cannot be reached.

We agree with commentor that infrastructure exists to dispose of treated water into local flood control channels, but there is a significant disadvantage of this method of "disposal." See response to AH#3.

RB#6. Commentor notes that the Watermaster: "has made arrangements to allow Responsible Parties in the Puente Valley who extract polluted water and to clean it up and to discharge it to the drainage system. This water becomes part of the usable water under the rules of Case #722647. In Baldwin Park the watermaster should not be allowed to claim no infrastructure or capability to dispose of more than 19,000 gpm as they have made accommodations for the clean up of contaminants in Puente Valley that is part of the San Gabriel River System."

EPA Response: Watermaster has made no such claim.

RB#7. Commentor's concluding recommendation is that EPA adopt "... a staged approach to well head clean up that would allow for a future project that would involve conjunctive use of wells in the Baldwin Park Operable Unit by Metropolitan Water District or others such as Three Valleys Municipal Water District that is within the San Gabriel River watershed."

EPA Response: We encourage additional clean up projects by parties other than EPA that are consistent with our remedial objectives.

VII. Comments by Sierra Club (SC)

(The Sierra Club submitted comments dated June 20, 1993 and August 9, 1993. The August comments include the Sierra Club's testimony presented on August 6 at the public hearing conducted by the California Assembly Committee on Groundwater Contamination and Landfill Leakage.)

June 20, 1993 comments

SC#1. "Representatives of the Sierra Club ... are pleased that EPA has come forward with a specific plan to begin cleanup. However considering the analysis presented in the Baldwin Park Operable Unit Feasibility Study, we would recommend selection of alternative 3 as the preferred plan for several reasons."

EPA Response: Comment noted.

SC#2. "Firstly, Figure 12-1 clearly shows that options 2, 3 or 4 all provide a higher degree of long-term effectiveness than Option 1. The study states that extracting 29,000 gpm total from three subareas within the Baldwin Park/Irwindale/Azusa area is the "optimum" scenario. We urge EPA to select the option which will best serve the long term interests of San Gabriel Valley residents. Achieving the most effective solution is worth the effort of overcoming difficulties in implementation."

EPA Response: We agree that the higher pumping rates included in Alternatives 2, 3, and 4 would provide a higher degree of long-term effectiveness, but do not believe that their implementation is warranted at present. See response to AH#1 on the use of the word *optimum* and Response B on the rationale for the size of the remedy. Difficulties in implementation are not the primary reason for selecting a project calling for the extraction of approximately 19,000 gpm (rather than 29,000 gpm) of contaminated groundwater.

SC#3. "If necessary EPA could request the court, which oversees the San Gabriel Basin adjudication, to allow 10,000 gpm to be exported from the basin under the condition that the Metropolitan Water District of Southern California (MWD) recharge a like amount of imported water to replace it. It would seem that there is a reasonable likelihood that the court would approve such a arrangement since it will provide the most efficient and cost effective cleanup of the San Gabriel Basin."

EPA Response: See Response D for a discussion of the role of Metropolitan Water District in the remedy.

SC#4. "Option 3 has the additional advantage of including MWD in the cleanup process. The entire clean-up effort would benefit from MWD's water quality technical expertise and financial resources. The availability of these resources to assist in the cleanup of the San Gabriel Basin is certainly in the long term best interests of the citizens of the San Gabriel Valley. Option 3 would, in addition to providing water to those areas which have water rights in the Main San Gabriel Basin, would also provide water to communities in the greater San Gabriel Valley who do not have such rights."

EPA Response: We agree that Metropolitan would bring water quality expertise but are uncertain whether they will contribute financial resources to the cleanup. See Response D.

SC#5. "Lastly Option 3 is preferable because it would place EPA in a stronger negotiating position with Potentially Responsible Parties (Peps). The Peps are already asking EPA to reduce the amount of water extracted to less than 19,000 gpm. Selecting the option with a higher extraction rate will give EPA more room to negotiate."

EPA Response: EPA is legally-required to select the remedial option that best meets the nine Superfund evaluation criteria (e.g., maximizing effectiveness, minimizing cost). Improving one's negotiating position is not among the nine criteria.

August 9, 1993 comments

SC#6. "...The Sierra Club strongly favors...a joint contamination cleanup-conjunctive use program ... The benefits of integrated...management of all local surface and groundwater...are becoming increasingly obvious to progressive water managers and the general public in Southern California. It is understandable that EPA cannot take the lead in planning for the use of groundwater stored under a conjunctive use program. As I understand it, one of your main concerns is that you have not yet received a firm commitment from either the Metropolitan Water District of Southern California (MWD) or a local San Gabriel Basin water agency for a larger treatment program (29,000gpm as compared to 19,000gpm) in the Baldwin Park area. We would urge that EPA work with MWD and local water agencies to address this issue. As you know, the San Gabriel Basin is an adjudicated basin in which numerous water rights holders claim the exclusive right to manage local resources as they see fit, and it will take time to work out a solution that is ultimately beneficial to all parties. I believe EPA would be remiss in adopting the attitude that it should merely seek the simplest short-term solution and then walk away from the situation. Although it may not have been intended, your comments at the August 6 hearing gave that impression [comments by Jeff Rosenbloom]. I therefore urge that you give further consideration to a more comprehensive cleanup-conjunctive use plan for the San Gabriel Basin."

EPA Response: Comments noted.

SC#7. Are "concerned first and foremost that the health of the residents and workers of the Basin be protected by insuring that drinking water provided by public and private retailers to consumers meet all current and prospective Federal and State standards. Secondly, we are concerned that the existing groundwater contamination not be permitted to expand beyond its present boundaries, thereby contaminating additional areas. Thirdly, we want to see that further contamination does not occur through discharge of additional toxics into the groundwater, and that those parties who were responsible for past contamination be held liable for their actions. And we want to ensure that the abundant groundwater resources of this Basin are effectively managed so this area can be relatively self-reliant for its water needs rather than rely on large quantities of costly imported water from Northern California and the Colorado River.

For these reasons the Sierra Club favors the adoption of the comprehensive plan prepared by the Federal Environmental Protection Agency to extract and treat 29,000 gallons per minute (gpm) of groundwater from three subareas within the Baldwin Park/Irwindale/Azusa Superfund Contamination Site. EPA has presented scientific data indicating that this would be the optimum level of treatment to effectuate systematic cleanup of existing contamination and prevention of contamination migration to additional areas."

EPA Response: See response to comment AH#1 and Response B.

SC#8 "...The Metropolitan Water District of Southern California is prepared to participate on a 25% cost-sharing basis. (See MWD Board Letter of January 28, 1993) The participation of MWD is likely to be crucial to the success of this project, both because of MWD's strong financial position and of that agency's acknowledged expertise in addressing complex problems of water treatment processes necessary to meet Federal and State drinking water standards.

Addition[al] funding up to an additional 25% is also available from the US Bureau of Reclamation pursuant to Section 1614 of the Public Law 102-575 (Reclamation Projects Authorization and Adjustment Act of 1992) for "the design, planning and construction of a conjunctive-use facility designed to improve the water quality in the San Gabriel groundwater basin and allow the utilization of the basin as a water storage facility." Given the difficulty of obtaining local and state funds to clean up contaminated groundwater in the San Gabriel Basin, it only makes sense to make use of this additional Federal funding."

EPA Response: As described in response to comment Tor#1 and in Response D, the magnitude and use of any funding provided by Metropolitan Water District or P.L. 102-575 remain uncertain.

SC#9. "It is our understanding that because of limited support from local water purveyors and objection from some responsible parties, EPA is recommending that treatment facilities for cleanup of the Baldwin Park/Irwindale/Azusa area be limited to producing only 19,000 gpm. The Sierra Club believes this level of treatment would not meet the long-term objective of cleaning up existing contamination, nor would it be the most cost-effective. Furthermore, it is doubtful that MWD or the Bureau of Reclamation would participate in a smaller-scale project, since the conjunctive use benefits of storing imported groundwater in the Basin would be significantly reduced. Without MWD's financial and technical support, and without Bureau of Reclamation funding, the prospects of effective action in the near term to accomplish both groundwater contamination remediation and conjunctive use objectives will be significantly diminished."

EPA Response: EPA's decision to select a remedy calling for the extraction of approximately 19,000 gpm is based primarily on technical considerations; it is not due to limited support from water purveyors or Peps. See Response B for an explanation of the size of EPA's remedy.

SC#10. " ...The Sierra Club would like to see a more meaningful role played by the California Environmental Protection Agency and the Regional Water Quality Board in addressing the San Gabriel Basin's groundwater contamination. The Regional Board has been chronically underfunded and understaffed in recent years and as a result, although it has dedicated staff, has been unable to be as effective as it should be in developing an understanding of the nature and extent of groundwater contamination in the Basin, identifying sources of this contamination, and taking effective enforcement action against the responsible parties. It is essential that funding for this agency be increased to ensure that remaining sources of contamination are brought under full control and that past sources of contamination are held responsible for their actions."

EPA Response: Comment noted.

VIII. Comments by the Superfund Working Information Group (SWIG)

SWIG#1. "..a commendable effort has been made by EPA to develop a cleanup project to address the problem of groundwater [in the Baldwin Park area]..., [and that on the whole], ... EPA's present plans for remediation of the Baldwin Park-Azusa-Irwindale contaminant plume seems to be going in the right direction, toward a final solution of cleanup and control of the VOC contamination in the Main San Gabriel Basin."

EPA Response: Comment noted.

SWIG#2. Commentor also asks that EPA consider "the practicalities of enlarging the output of the project, if feasible."

EPA Response: EPA refers to the selected remedy as an *interim action*, to reflect the possibility that additional projects may be needed in the Baldwin Park area. EPA will use information collected after construction and operation of the selected remedy to help determine the need to enlarge or in other ways modify the project. EPA's decision to select a project extracting and treating approximately 19,000 gpm rather than a larger project is discussed in Response B.

...FEDERAL AND STATE LEGISLATIVE REPRESENTATIVES...

IX. Comments by Hilda Solis, Assemblywoman, 57th District, California Legislature

Sol#1. Commentor urges EPA "to consider the merits of a conjunctive use program as a means to remedy both VOC and nitrate contamination ..." Commentor argues that conjunctive use would offer the "potential to cleanup the contamination in the Basin while at the same time both providing an environmentally-sound method for storing water and offering a financial package which ought to prove beneficial to all affected parties."

EPA Response: See Response D.

X. Comments by Esteban Torres, Representative, 34th District, U.S. Congress

Tor#1. "I am struck by the fact that the alternative EPA prefers (Alternative One) is the least environmentally sound alternative of the four. ... Alternative One would pump 19,000 gpm ... to be used only by the local water purveyors... Alternatives Three and Four would pump 29,000 gpm... The fundamental difference between these two alternatives [one and four] is that the third and fourth alternatives provide a conjunctive use element and would potentially remove one-third more contaminants from the water basin.

On the surface, Alternative Four appears to cost the taxpayer significantly more than Alternative One. However, last year Congress authorized funding 25% of the San Gabriel Basin Project in Section 1614 of the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 101-575). And as a result, the Board of Directors of the Metropolitan Water District (MWD) committed significant resources to this worthwhile project.

If you review Alternative One, (capital cost: $47 million, to be entirely funded by local businesses which are held responsible for the contamination) and compare it to Alternative Four (capital costs: $78 million with only $39 million (50%) funded by local businesses and 50% by Section 1614 funds and MWD funds) I trust you will conclude that Alternative Four is better from every perspective. Alternative Four will give us the capacity to remove more contaminants from the groundwater and will save the local business community $8 million.

Even if EPA were to select a clean-up technology that goes beyond 'air stripping' to something like the 'liquid granular activated carbon' process recommended by MWD, the total cost of Alternative Four would be $100 million, with $50 million coming from the local business community and $50 million coming from MWD and Section 1614. The additional $3 million in local costs is a small price to pay to achieve a 33 percent increase in contaminant removal. I suggest that the standard measure of cost-effectiveness (cost/ton removal) should be thoroughly analyzed in light of the above.

Additionally, I want you to know that, at my urging, the California Congressional Delegation has been actively pursuing a $5 million FY '94 appropriation for the

implementation of Section 1614 because the conjunctive use project is excellent public policy. Southern California gets an enhanced supply of water which reduces pressure on the Colorado River and Northern California, and, more importantly, the citizens in the San Gabriel Valley get a cleaner supply of water.

If the reason that EPA has recommended Alternative One is based on what has been called the 'institutional problems' associated with Conjunctive Use, I strongly recommend that the Agency take another look at its rationale. While I realize that EPA doesn't want to be "water broker" in Southern California, it can certainly assist negotiations so that other, and perhaps more appropriate agencies, manage our water resources. However, I don't believe that any 'institutional problem' justifies selecting a clean-up alternative which accomplishes less clean-up at greater cost to area businesses and residents."

<u>EPA Response</u>: Internal EPA policy required an immediate response to Congressman Torres. EPA's response (without the enclosed table), delivered in a letter dated September 9, 1993, is reprinted here. Also see Response D.

Honorable Esteban E. Torres
U.S House of Representatives
1740 Longworth House Office Building
Washington, D.C. 20515

Dear Mr. Torres:

Thank you for your letter of August 10, 1993 to Wayne Praskins, one of our Superfund Project Managers, concerning the U.S. Environmental Protection Agency's (EPA) Proposed Plan for the Baldwin Park Operable Unit of the San Gabriel Valley Superfund Sites. We appreciate your continued support for efforts to clean up the soil and groundwater contamination in the San Gabriel Basin and your specific comments on the Feasibility Study and Proposed Plan. We will, as always, seriously consider your views in reaching a decision on how to proceed with the clean up.

As you know, EPA's primary responsibility is to clean up the soil and groundwater contamination. We share your goal, however, of also identifying and supporting clean up projects that would improve the use of California's limited water resources. We have been working with staff of the Metropolitan Water District of Southern California (Metropolitan) and other local water agencies for more than three years to evaluate and work out potential arrangements for a joint clean-up/conjunctive use project.

I believe that we are in agreement on most aspects of the cleanup. In the remainder of this letter, we wish to explain the rationale for our position and respond to your comments on the involvement of Metropolitan and the size of the proposed project.

Involvement of Metropolitan Water District

In the formal Superfund feasibility study prepared for the Baldwin Park Operable Unit, we evaluate four clean up options (i.e., "Alternatives"). Alternatives One and Two assume distribution of treated water to local water purveyors; Alternatives Three and Four "provide a conjunctive use element" (i.e., assume the distribution of treated water to Metropolitan).

EPA's Proposed Plan incorporates elements of each of these Alternatives, including the potential for conjunctive use. (Your letter mistakenly asserts that EPA's proposal is identical to Alternative One). EPA's Proposed Plan recommends that treated water be distributed to any one or a combination of six water purveyors, including Metropolitan. (See pages 7 and 11 of Proposed Plan.) Our proposal does not specify Metropolitan or any other single purveyor as the one and only recipient of treated water, because of the many unresolved cost and institutional issues that make it uncertain whether Metropolitan involvement would in fact reduce costs or speed clean up. We believe that it would be unwise for EPA to commit to distributing water only to Metropolitan or any other recipient at this time.

Metropolitan involvement does offer potential advantages to the Baldwin Park Operable Unit such as their expertise in building and operating large water supply projects and the benefits associated with providing consumers throughout Southern California with a new source of water during peak demand periods.

EPA would in fact wholeheartedly support Metropolitan involvement if it would decrease the cost of the project and reduce institutional barriers. Unfortunately, neither advantage has been demonstrated. Metropolitan is attempting to better define project costs and resolve institutional issues, but there remains the risk that Metropolitan involvement could increase the cost or delay implementation of the project. The impacts of Metropolitan involvement on project cost and institutional complexity are discussed further below. Issues associated with Metropolitan involvement are described in more detail in the Proposed Plan and Feasibility Study.

Metropolitan Funding Contribution

Your letter presumes that one-half of the cost of a project in which Metropolitan is involved would be funded in part by Metropolitan and in part by a Federal appropriation authorized by Public Law 102-575. You use this assumption to conclude that a project in which Metropolitan is involved would be less expensive than one in which they are not involved. Our understanding differs. Metropolitan staff have stated their intent only to fund "enhancement costs." Enhancement costs are costs in excess of the costs of clean up due solely to Metropolitan's water supply requirements (e.g., additional pipelines or pumping stations needed to deliver water to Metropolitan's existing facilities, additional treatment costs resulting from imposition of treatment requirements exceeding Federal and State standards). Metropolitan has committed significant resources to studying the feasibility of a conjunctive use project, and to securing outside sources of funding to pay for construction of a project, but to date, Metropolitan has not provided any commitment to fund clean up costs.

In addition, our understanding is that any funding from P.L. 102-575 would reduce Metropolitan's contribution and not offset either EPA or Potentially Responsible Party (PRP) funding. Our conclusion is that the costs borne by EPA or the local business community would not change whether or not Metropolitan is involved. Please let us know if our understanding is incorrect.

Institutional Complexity Associated with Metropolitan Involvement

As described in more detail in the Feasibility Study, there are other potential complications associated with supplying water to Metropolitan that could delay clean up. They include the need for an agreement to store and export water in and from the Basin, Metropolitan compliance with the California Environmental Quality Act, and Metropolitan concerns about liability resulting from involvement at a Federal Superfund Site. Perhaps the most significant complication is that Metropolitan can benefit from receiving treated water only during the spring and summer peak demand months (probably May to September, but the actual timing would vary year to year). If treated water is supplied to Metropolitan for use only during peak periods, it would be necessary to develop arrangements to supply treated water to one or more secondary recipients during fall and winter offpeak months. EPA and Metropolitan are investigating the feasibility of such arrangements, but they remain uncertain.

Project Size

In your letter, you recommend that EPA select the larger project evaluated in Alternatives Three and Four, rather than the project evaluated in Alternative One. Alternatives Three and Four evaluate a project involving the extraction and treatment of contaminated groundwater from three areas (the upper, middle, and lower areas); Alternative One evaluates a project involving the extraction and treatment of contaminated groundwater from two areas (the upper and lower areas). Alternatives Two and Three would result in extraction of approximately 29,000 gallons per minute (gpm); Alternative One would result in extraction of approximately 19,000 gpm.

Our decision to propose a 19,000 gpm project, rather than a 29,000 gpm project, is due primarily to uncertainty about the benefits of extracting in a third area (the "middle area"). Additional extraction in the middle area would more rapidly reduce contaminant concentrations in portions of the San Gabriel Basin aquifer, but by an unknown amount. Our ability to quantify the benefits of additional pumping is limited by uncertainty in the precise extent of contamination, in the relative masses of contamination in different portions of the aquifer, and in the presence of preferential flow pathways and other local-scale aquifer phenomena that will affect the time required for clean up. Our decision to propose extraction in two rather than three areas reflects these physical uncertainties, the cost of the proposed clean up, and the fact that EPA's proposal is an interim action which may be supplemented in the future. A secondary reason for proposing 19,000 gpm rather than 29,000 gpm is the added complexity of distributing an additional 10,000 gpm of treated water.

We are still evaluating other comments on our proposal. Some comments call for the 29,000 gpm project, others call for a smaller project of approximately 8,500 gpm. We should note that conjunctive use remains an option in either a 19,000 gpm or 29,000 gpm project.

We thank you again for your continued support for the clean up of the San Gabriel Basin. I hope that this letter addresses the concerns expressed in your letter and better explains the rationale behind our proposal.

Enclosed is a table summarizing comments submitted to EPA on the Baldwin Park Operable Unit Feasibility Study and Proposed Plan, as you requested in your letter of August 16, 1993. If I can be of further assistance, please call me or my Congressional Liaison Officer, Sunny Nelson, at (415) 744-1562.

Sincerely,

[Original signed by]

John C. Wise
Acting Regional Administrator

...THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL ...

XI. Comments by The California Department of Toxic Substances Control (DTS)

DTS#1. "We concur with the United States Environmental Protection Agency's (US EPA) selected remedy..."

EPA Response: Comment noted.

DTS#2. DTSC does not believe that EPA's proposed remedy will be implemented in a timely manner using the EPA's "enforcement first" approach. Foresees operation of EPA's selected remedy no earlier than 1997 and notes that by this time the contamination in the lower zone could move almost three quarters of a mile downgradient. Recommends that EPA initiate investigations needed for remedial design independent of and concurrent with negotiations to speed project implementation. Also recommends that EPA expand/augment the current Big Dalton Wellhead Treatment Plant project to include the investigations, wells, and treatment facilities needed for containment of the southern end of the zone of contamination.

EPA Response: Comments noted. EPA intends to initiate negotiations as planned in 1994 and will consider steps to begin investigation work needed for remedial design early in the negotiation process.

DTS#3. Asks that "flexibility [be] written into the Record of Decision (ROD) to allow alternative 3 or 4 (or a variation of these conjunctive use alternatives) to be implemented if the institutional arrangements can be completed so as not to delay project implementation."

EPA Response: EPA's Record of Decision includes flexibility to supply treated water to purveyors for local use or export, or for recharge.

DTS#4 (submitted as comment 1a). In this comment and the two subsequent comments, DTSC states its belief that "the objectives stated in appendix E for the groundwater monitoring program do not adequately describe all the information needed for the design, for monitoring of the effectiveness of the alternatives, or for determining if aquifer restoration is feasible."

DTSC states the groundwater monitoring program should "provide accurate determinations of ground water flow directions and seasonal variation of the flow direction. This will include 1) characterization of both horizonal and vertical gradients within the OU area, 2) the extent of the capture zone around each extraction well, 3) the effect of recharge in the nearby spreading grounds, and 4) the effect of ground water production on the periphery of the operable unit boundaries. Our concern is that the proposed monitoring system will not provide accurate ground water level information due to the predominant use of production wells with multiple screened intervals. Water levels from these wells can be biased by vertical gradients. The proposed monitoring system should be established by first evaluating the existing wells for their suitability based on screened interval and presence of vertical gradients. We believe a much larger number of piezometer clusters will be needed to accurately depict the ground water flow directions than currently indicated in appendix E."

EPA Response: We agree that water level data should be collected to allow for accurate determinations of horizontal and vertical gradients in the vicinity of the remedial action. We agree that the data should depict significant temporal variation in gradients and reflect any effects of nearby recharge or pumping.

We recognize the limitation of production wells noted in your comment: that water levels measured in production wells reflect average pressures across the screened interval. Because relatively little information in available to determine vertical gradients, we intend to first sample existing wells and install and sample fifteen new monitoring well clusters (we have increased the recommended number of wells - see response to Aj#58), which will provide information on the magnitude of any vertical gradients. If significant vertical gradients are detected in the new wells, complicating the interpretation of water level data collected from production wells, we agree that additional monitoring wells or piezometers may be needed to replace existing wells.

DTS#5 (submitted as comment 1b). "Provide additional data on the properties of the aquifer in the operable unit area. These data include depth of alluvium, lithologic characterization, organic material content of the alluvium, and the hydraulic conductivity and storativity data obtained from pumping tests with observation wells or slug tests."

EPA Response: We agree that the monitoring program may include measurements of hydraulic conductivity and other aquifer properties needed to more accurately simulate groundwater flow in the Baldwin Park area. Additional flow modeling may be completed to refine extraction rates and locations, and to evaluate the performance of the remedy after installation. We are uncertain, however, of the intended use of data on soil organic content or other properties that are typically used to simulate contaminant transport, rather than groundwater flow. We remain open to collecting additional data, however, if their use is clarified.

DTS#6 (submitted as comment 1c). "Provide additional data on the attenuation mechanisms which are affecting the rate of contaminant movement. This would include characterization of 1) the effect of sorption and dilution through the use of tracer studies with compounds which are not biodegradable, and have similar sorptive properties as the volatile organic compounds, 2) the natural microbial populations in the aquifer, and 3) the stoichiometry of electron donors and acceptors."

EPA Response: As in the previous comment, we are uncertain of the intended use of data that are typically used to simulate contaminant transport, rather than groundwater flow. We remain open to collecting additional data, however, if their use is clarified.

DTS#7 (submitted as comment 2). "The proposed plan mentions the existing wellhead treatment plants (WTPs) being operated by the Valley County Water District and the La Puente Valley County Water District. It does not however state that they will be considered as part of the remedy. These existing treatment plants could form an

integral part the remedy and may provide considerable savings since there is no need for connecting piping to distribute treated water to the purveyors. At a minimum, the decision on whether to incorporate these treatment plants in the remedy should be based on an evaluation conducted during the remedial design phase."

EPA Response: We agree with the comment. The contribution of existing projects in the Baldwin Park area to EPA's remedial objectives will be determined during remedial design.

DTS#8 (submitted as comment 3). "The FS recommends extraction of ground water in the upper 400-500 feet of the aquifer. Figure 3-9 indicates that high concentrations of VOC's are present between 400-600 feet deep in the aquifer. Extraction should be conducted in the upper 600 feet in the aquifer. Extraction over a greater depth interval will require increases extraction rates to achieve the same capture zones."

EPA Response: We agree that high levels of contamination may be present across the upper 600 feet of the aquifer in portions of the OU area. Extraction wells will need to capture water from across the entire extent of high-level contamination, and the FS should have stated that extraction would be necessary from the upper 400 to 600 feet of the aquifer. The preliminary extraction well configurations included in the FS extend approximately 400 to 550 feet into the aquifer, and their influence likely extends beyond the base of the well. However, as stated in the Proposed Plan, actual extraction rates will be determined during remedial design. At that time, additional data will be available on the depth of contamination and the actual extraction wells will be designed accordingly.

DTS#9 (submitted as comment 4). "On table 5.5: Cancer Slope Factors listed for benzene, carbon tetrachloride, chloroform, methylene chloride, and tetrachloroethylene are less than the cancer slope factors listed by the California Environmental Protection Agency (Cal/EPA). The Cal EPA slope factors are ARARs and should be used in the toxicity assessment. Regarding cross-route extrapolation, if only an oral RfD has been determined for a chemical, as a default, the oral RfD should also be used for calculating risks via the inhalation and dermal routes of exposure."

EPA Response: We have recalculated excess cancer risk using Cal EPA slope factors. As presented in Table RS-2 included in this Responsiveness Summary, the risk estimate does not change significantly.

...WATER PURVEYORS, WATER DISTRICTS, AND THE WATERMASTER...

XII. Comments by the Main San Gabriel Basin Watermaster (WM)

WM#10. The Main San Gabriel Basin Watermaster (Watermaster) states that "In general, we concur with the concept described in the Proposed Plan including the use of existing wells for extraction and treatment, and the use of treated water to supply drinking water to the Basin residents [rather than recharge]." Watermaster offers to work with EPA to locate extraction and monitoring wells, and to make arrangements for distribution of treated water. Watermaster also notes that a portion of the Watermaster Technical Plan for Basin Ground-Water Cleanup closely resembles EPA's Proposed Plan.

EPA Response: Comments noted.

XIII. Comments by Metropolitan Water District of Southern California (MWD)

MWD#1. "Metropolitan supports your efforts to address contamination in that area's vital groundwater supply. However, the Proposed Plan fails to recognize the importance of preserving the Main San Gabriel Basin (Basin) as a natural public resource..., [and] fails to include cleanup efforts or a conjunctive use element that could optimize the Basin's storage potential. Metropolitan, in short, is disappointed that your preferred remedial alternative is local pump-and-treat facilities with the single objective of controlling migration."

EPA Response: EPA believes that its remedy does reflect the importance of the San Gabriel Basin as a resource for present and future residents and businesses in the Valley. See Response B for supplemental information on the rationale for the scope and size of EPA's remedy. We believe that the characterization of EPA's proposed remedy as "local" and "single-objective" is misleading. We presume that the word "local" refers to the disposition of treated water from the remedy. EPA's proposal, and the Record of Decision, both allow treated water to be distributed locally or to be exported from the Basin by Metropolitan. EPA's actions in no way preclude or favor either option. The comment appears to express disappointment that EPA is not prescriptive in *requiring* treated water to be exported by Metropolitan.

See Response D for a discussion of reasons that EPA has not specified Metropolitan as the recipient of the treated water.

We also wish to emphasize that the objectives of EPA's remedy are to limit migration *and* to remove contaminant mass from the aquifer (see page 1-6).

MWD#2. Metropolitan's lists the benefits of a conjunctive use project:

> **a) provide clean imported water to the basin;**
> **b) reliably treat contaminated groundwater to drinking water standards that are stricter than the State and Federal requirements;**
> **c) improve water supply reliability for the region;**
> **d) assure beneficial use of the treated groundwater year round, even when local purveyors are not able to use the water.**

EPA Response: We note that benefits b) and d) are speculative. Metropolitan has stated that if it participates in the remedy it may wish to reduce contaminant concentration to below Federal or State standards, but has not committed to this action (item b). Nor has Metropolitan explained in detail the conditions that would need to be met, particularly the costs, to assure beneficial use of the water year-round (item d).

MWD#3. Metropolitan notes that EPA's proposed remedy is "down-sized" in relation to remedial alternatives under consideration early in the RI/FS process. Asserts that a larger 100 million gallons per day project (four times the size of EPA's proposal) would "optimize" the amount of contaminant removal.

EPA Response: As described in the FS (page 11-2), EPA initially studied but screened out larger projects. Projects larger than proposed by EPA would increase, but not "optimize," the amount of contamination removed.

MWD#4. Argues that EPA's proposal will not satisfy EPA's remedial objectives by failing to reduce VOC concentrations in the lower area "to the maximum extent possible" or prevent future increases. Notes that "VOCs will continue to migrate from the middle area into the lower area, thus increasing the concentrations in the lower area" and that projects larger than proposed by EPA are feasible.

EPA Response: Commentor is correct that EPA's proposal will not completely stop contaminant migration throughout the area of contamination. No realistic proposal, whether it included pumping in two, three, or more subareas, can stop all migration. We agree that projects larger than proposed by EPA are feasible, but do not warrant selection at this time. See Response B for additional discussion of the benefits and limitations of EPA's remedy.

MWD#5. Expresses concern that air stripping will not reliably remove 1,2-dichloroethane (1,2 DCA) from groundwater. Notes that staff at the California Department of Health Services, Office of Drinking Water (DHS-ODW) have indicated that a liquid phase granular activated carbon treatment process may be required if the influent water is expected to contain organic compounds with low Henry's constants, such as 1,2 DCA.

EPA Response: EPA agrees that air stripping may not be the preferred technology for all or part of the remedy, particularly if individual "wellhead" treatment facilities are installed at locations where contaminants that are resistant to air stripping are present at relatively high concentrations. Final decisions on treatment technology will be made during remedial design, in cooperation with the Department of Health Services. The suitability of air stripping depends on future contaminant concentrations, treatment configuration (i.e., whether groundwater from multiple extraction locations is blended at centralized treatment facilities), siting limitations, and other factors.

MWD#6. Metropolitan expresses dissatisfaction that the Proposed Plan "does not address the issue of nitrate concentration, which over the life of the project will exceed maximum contaminant levels and require treatment."

EPA Response: EPA anticipates that nitrate levels at one or more extraction locations may exceed the Maximum Contaminant Level during the life of the project. The need for treatment, and its timing if needed is, however, difficult to predict. It depends on future contaminant concentrations at extraction locations, the extent to which groundwater from multiple extraction locations is blended at centralized treatment facilities, the use of the treated water, and, for some uses, the ability to blend high-nitrate water with low-nitrate water to meet the nitrate standard.

MWD#7. Believes that "assumptions used in selecting the treatment processes and extraction rates...have led to low capital and operation and maintenance cost estimates..[and that] this could lead to insufficient land acquisition and inefficient use of public funds therefore jeopardizing the ultimate success of the project. Metropolitan believes that liquid granular activated carbon and ion exchange, or an alternative strategy for nitrate control, should be included in the cost estimates."

EPA Response: Commentor does not explain how assumptions used in selecting the extraction rates may have led to low cost estimates. Commentor expresses the concern that the remedy may require additional treatment beyond that assumed in the FS, but as noted in the FS and in the previous two responses, the need for supplemental VOC or nitrate treatment is difficult to predict. EPA therefore chose not to include the costs of supplemental treatment in its costs estimates. We note that EPA's cost estimates include an added 35% for "scope" and "bid" contingencies - i.e., to account for the risk of higher than expected labor or material costs and other factors that may increase costs. Furthermore, EPA's goal in estimating costs in a Superfund feasibility study is that the true cost be no more than 50% higher or 30% lower than EPA's estimate. We believe that our estimates meet this goal.

MWD#8. Notes that "Metropolitan's Board has supported, in concept, providing 25 percent cost sharing for a conjunctive use cleanup project to cover the water supply benefits resulting from the more stringent drinking water objectives and increased surface pumping costs required to convey treated water to Metropolitan's distribution system. In addition, Metropolitan has successfully worked with member agencies, Congressman Esteban Torres, and others to secure 25 percent federal cost sharing from the Bureau of Reclamation for the conjunctive use project. Claims that EPA has

jeopardized Metropolitan's involvement and the potential for other federal funding for a conjunctive use project."

EPA Response: As the comment notes, any funding contributed by Metropolitan would be earmarked first for "enhancement costs" resulting from more stringent or more expensive requirements resulting from Metropolitan involvement. The magnitude of any Metropolitan financial contribution in excess of these enhancement costs (i.e., funding that would reduce EPA or PRP costs) remains uncertain. Also see response to Tor#1 and Response D.

MWD#9. "Metropolitan requires a commitment from EPA to undertake a cooperative conjunctive use project of approximately 25-30 mgd capacity."

EPA Response: EPA is committed to a project of approximately 27 MGD. As noted in the Proposed Plan and in response to comment MWD#1, however, EPA does not believe it is prudent at this time to commit to supply all or part of the treated water to Metropolitan.

XIV. Comments by Southern California Water Company (SoC)

SoC#1. "Southern California Water Company is concerned about being charged, indirectly, for a project that may be short-lived."

EPA Response: See response to comment SoC#4 below.

SoC#2. Has a source of funding, other than water revenues, been secured?

EPA Response: As stated in the Proposed Plan, EPA intends to negotiate with San Gabriel Valley property owners and businesses responsible for the contamination to secure funding for the construction and operation of the selected project. The only water revenues that are expected to be used to fund the project are payments by water companies that agree to accept and distribute treated water. The payments would offset any water company savings resulting from not using other sources of water.

SoC#3. "Is there any guarantee that the "plume" of contamination will still be in the same location at the time the proposed water treatment facility is placed into service?"

EPA Response: There is no absolute guarantee that contaminant concentrations will not change at any given location with time. The likelihood of changes is perhaps highest along the periphery of the plume or plumes of contamination (e.g., at the Covina Irrigating Company wells). EPA has, however, proposed extraction at or near locations that have shown high, sustained levels of contamination, in most cases for over a decade. Investigation work has also confirmed the presence of significant continuing subsurface sources of contamination that will continue to contribute to the need for groundwater treatment for years to come. EPA believes that there is little likelihood that contaminant concentrations will rapidly decrease at these locations.

SoC#4. "If the financial "life" of the proposed project is 30 to 40 years, who continues to pay for a project which may no longer be needed, i.e. if the contaminated "plume" moves beyond the proposed groundwater extraction facilities?"

EPA Response: No one will pay; the project will be shut down after it is no longer needed. We believe it is highly unlikely that the plume or plumes will move beyond the proposed extraction facilities in the near future. See response to SoC#3.

SoC#5. "Is EPA aware that approximately 60% of the entire population of the San Gabriel Valley is served by Private water utilities, many of which are regulated by the California Public Utilities Commission (CPUC)?"

EPA Response: EPA is aware that some companies affected by contamination in the Baldwin Park area are private, investor-owned utilities. EPA staff have consulted regularly with these companies about its clean up plans.

SoC#6. "Will EPA agree to seek CPUC "approval" of the proposed project, Prior to awarding any construction contracts?"

EPA Response: EPA will not seek CPUC approval of its proposed project. EPA will, however, work with the CPUC to facilitate water utility participation if private water utilities need to consult with or obtain approval from the CPUC before accepting treated water from EPA's selected remedy.

SoC#7. "Has EPA given serious consideration to the water utilities' response to groundwater contamination cleanup, i.e. individual well-head treatment units, designed to be moved to an alternate site, as the need arises?"

EPA Response: Yes, EPA has considered plans by water utilities in formulating its proposal. EPA is aware of treatment facilities in operation or planned for Valley County Water District's Arrow/Lante, Main, and Big Dalton wells, La Puente Valley County Water Districts wells, and San Gabriel Valley Water Company's B6 wells. Continued operation of some of these facilities may offset a portion of the extraction and treatment called for in EPA's proposal, but EPA does not believe that extraction at these facilities is sufficient to meet its remedial objectives.

SoC#8. "How will EPA pump from basin and keep basin operated/managed properly?"

EPA Response: EPA does not plan to increase its involvement in the operation or management of the basin beyond the efforts needed to implement its selected remedy. We expect all increases or decreases in the extraction, transport, or recharge of the basin's water resources to be consistent with the Alhambra judgment.

SoC#9. "How will this affect operation of nearby wells of other producers?"

EPA Response: EPA or Peps may attempt to reach agreements with water purveyors for use of inactive wells or the continued operation of active wells whose operation contributes to EPA's remedial objectives. Extraction at new wells may also cause limited drawdown at existing wells, but there are few active water supply wells in the vicinity of likely extraction locations and the magnitude of any effects are expected to be small.

SoC#10. "Is plant capable of handling proposed Arsenic regulations? Is cost estimate reasonable, addressing increases in operation due to regulations?"

EPA Response: EPA does not anticipate treating groundwater for arsenic, unless doing so allowed the water to be distributed more cheaply than would otherwise be possible. If water is supplied to purveyors, water producers will be expected to pay for any treatment that would be required in the absence of the VOC contamination.

SoC#11. "Please let me know what EPA's timetable is..."

EPA Response: EPA expects to begin formal negotiations with PEPS for design, construction, and operation of its selected remedy in Spring 1994.

XV. Comments by Three Valleys Municipal Water District (TV)

TV#1. Commentor "support[s] the EPA's efforts to address contamination in this key water supply source."

EPA Response: Comment noted.

TV#2. Commentor believes that EPA's "implied position" is that institutional issues associated with distributing water to local purveyors or exporting water from the San Gabriel Basin are insurmountable. Commentor disagrees with this position, emphasizing that Metropolitan Water District and other agencies have begun discussions to resolve various institutional issues. Commentor recommends "that the report should weigh scientific evidence more heavily than institutional issues in arriving at its preference for action."

EPA Response: Commentor incorrectly infers EPA's position. EPA does not believe that institutional issues associated with distributing water are insurmountable, but does believe that institutional issues should be considered in selecting the remedy. During the last several years, EPA has led efforts to identify and resolve institutional issues associated with distributing large amounts of treated water in the Azusa/Irwindale/Baldwin Park area. EPA has worked with Metropolitan Water District, Watermaster, staff of your Water District, other local agencies, and individual water companies to identify potential amounts and delivery locations for treated water. Section 9 and Appendix D describe the results of EPA's discussions and evaluations.

TV#3. Commentor notes that EPA refers to the 29,000 gpm option as "optimal" and believes that EPA has not adequately evaluated the proposed 19,000-gpm option. Commentor asks: "... is there any difference in benefit between either of the 29,000-gpm options and the 19,000-gpm option?"

<u>EPA Response</u>: See response to AH#1 and Response D.

TV#4. Commentor believes that if EPA could be more optimistic about the resolution of institutional issues, and would propose extraction and treatment of 29,000 gpm (rather than 19,000 gpm), it "would have boosted the probability of resolving the institutional issues, instead of undermining the efforts already underway by MWD and others." Finally, commentor urges EPA and other agencies to proceed without delay to implement the most expeditious and technically sound remedial alternative.

<u>EPA Response</u>: EPA does not believe that it has "undermined" efforts by Metropolitan or others. EPA believes that its responsibility is to identify both advantages and disadvantages of working with Metropolitan and other project alternatives, and to work to identify and implement the most effective, most easily implemented, most widely supported, and least cost alternative.

XVI. Comments by Advanced Environmental Controls Consulting and Engineering Services

AEC#1. Commentor believes that: "Overall, the EPA's approach is a reasonable one [although] more clarification is necessary on the liability and financial issues."

EPA Response: Comment noted.

AEC#2. "How is the EPA planning on narrowing down the list of Potentially Responsible Parties ("PRPs") that will be financially accountable for the cleanup of the Basin?"

EPA Response: EPA is evaluating information on chemical usage and handling, type of industrial operation, length of occupancy, and presence of soil, soil gas, and groundwater contamination to identify contributors to the groundwater contamination. EPA will attempt to reach an agreement with contributors to the groundwater contamination to finance the cleanup.

AEC#3. "Since thousands of businesses are thought to have used chemicals that could have caused the groundwater contamination, who is responsible and to what degree is the company financially responsible?"

EPA Response: Hundreds or thousands of businesses may have used the chemicals found in the groundwater, but only a fraction of these businesses appear to be significant contributors to the groundwater contamination. EPA expects to identify these companies in spring 1994. Also see response to AEC#2 and AEC#4.

AEC#4. "Will facilities with deminimus concentrations of VOCs, 1,1,1-trichloroethane, methylene chloride, and total petroleum hydrocarbon in onsite soil samples be expected to contribute to the cleanup? Where will the EPA draw the line for whether or not a facility is financially responsible? Is there any way to have a facility removed from the PRP list based on Contamination Soil Reports?"

EPA Response: EPA has not completed its evaluation of Potentially Responsible Parties; EPA expects to complete its evaluation in early 1994. The evaluation will include a review of facilities eligible for de minimis settlements. We anticipate that some facilities initially identified as *possible* contributors through General Notice of Liability letters may be eligible for de minimis settlements.

AEC#5. "Will the EPA consider Phase I and Phase II Environmental Site Assessments to evaluate the potential of site contamination due to on-site and neighboring sources from either past or present land use activities? Since soil contamination was first discovered in the Basin in 1979, historical information is important to determine the extent of the liability and who is responsible for the contamination."

EPA Response: EPA will consider current and historical information in its efforts to identify contributors to the groundwater contamination.

AEC#6. "What percentage of the cleanup will consumers have to contribute? Will it be $20 per year per household maximum raised from the San Gabriel Basin Water Quality Authority?"

EPA Response: EPA does not plan to ask consumers to directly pay for any portion of the cleanup.

AEC#7. "What percentage of the $7.5 billion superfund will be allocated as a loan grantor for qualified businesses?"

EPA Response: Section 111 of CERCLA authorizes use of the Superfund trust fund for payment of selected governmental response costs and for other purposes. Section 111 does not authorize use of the trust fund for your proposed purpose.

AEC#8. "In some areas within the basin, the water table is at a depth of 20 to 30 feet. Several companies will have soil contamination due to the contamination travelling onsite from nearby facilities. How is the EPA going to address this issue?".

EPA Response: EPA considers all information relevant to the identification of sources of contamination, including any information that suggests that contamination detected at or beneath a facility originates from adjacent facilities or properties. Relevant information includes present and past chemical usage and handling at the facility of interest and at neighboring facilities, and contaminant concentration gradients observed in soil gas, soil, and groundwater (i.e., spatial and temporal patterns of contamination).

Depth to groundwater in the Azusa/Irwindale/Baldwin Park area is typically one hundred to three hundred feet.

AEC#9. "Is the EPA planning on implementing soil standards and threshold values for companies to determine the degree of contamination?"

EPA Response: EPA is carrying out literature reviews, evaluations of methodologies used at other Superfund sites, computer modeling, and other activities to help refine soil contamination "action levels" and cleanup goals. These activities are separate from the Baldwin Park Operable Unit and will not be included in the Baldwin Park Operable Unit Record of Decision.

AEC#10. "Since banks and lending companies will not issue loans for cleaning up contaminated waste, how are the PRPs suppose to pay for the cleanup? Either new regulations or reorganization of the financing structure must be

implemented to insure proper cleanup, protect human health, and contain the contamination from spreading out of the site area."

EPA Response: EPA will use authority provided by CERCLA to evaluate the ability of responsible parties to pay for cleanup, as well as consider other financing mechanisms allowed by law.

AEC#11. "After reviewing the Baldwin Park Operable Unit Feasibility Study Report, the actual costs could easily exceed the projected budget cost of $47 million to build the treatment facilities and $4 million maintenance and operating costs. What cost containment strategies will be used to assure that the costs remain at or below these projected levels?"

EPA Response: EPA's goal in a feasibility study is for the true cost to be no more than 50% greater or 30% less than the estimated cost. We note that EPA's cost estimate of $47 million in capital costs already includes an added 35% to account for unforeseen factors that may increase costs. If EPA funds the project, EPA will use sound engineering and construction principles to ensure that the remedy is properly designed and built at reasonable cost.

XVII. Comments by Aerojet Gencorp

Aerojet Gencorp (Aerojet) submitted three sets of comments jointly with Azusa Land Reclamation (ALR) during the public comment period:

- *o "Review Comments, Baldwin Park Operable Unit Feasibility Study Report, April 2, 1993"*
- *o "Review Comments, Proposed Plan, May 1993, Baldwin Park Operable Unit"*
- *o "Proposal for Technical Modifications Optimization of U.S. EPA Region IX Subarea 1 Proposed Project, Baldwin Park Operable Unit," August 12, 1993*

Aerojet also submitted:

- *o an 18 page letter with "general comments on and legal analysis of the Baldwin Park OU FS and Proposed Plan," dated August 10, 1993, and*
- *o two videotapes titled "Aerojet Submission of Nicholas Pogencheff Testimony, August 4, 1993 [Edited]."*

Finally, Aerojet/ALR jointly submitted an addendum to their "Proposal for Technical Modifications Optimization of U.S. EPA Region IX Subarea 1 Proposed Project, Baldwin Park Operable Unit" dated November 29, 1993. *The Oil and Solvent Process Company*

(OSCO) also joined in these comments, which were submitted after the close of the formal public comment period.

Many of these sets of comments are internally redundant and duplicate each other; in some cases the same comment is presented 10 to 15 times. We present detailed responses to the most detailed set of Aerojet/ALR comments, which are the "Review Comments, Baldwin Park Operable Unit Feasibility Study Report, April 2, 1993," followed by briefer responses to the other sets of comments.

XVII.1. Response to "Review Comments, Baldwin Park Operable Unit Feasibility Study Report, April 2, 1993"

General Comments (pp. 1-7)

Aj#1. Aerojet criticizes EPA's Proposed Plan as based on a "preponderance of assumptions and simplifications"; as not technically defensible or effective; not supported by adequate water quality or hydrogeological data; as unjustified without a higher level of detailed technical analysis; as based on inadequate modeling; promising exaggerated or unsubstantiated benefits; as inconsistent with acceptable engineering practices and principles; as inconsistent with the National Contingency Plan; and as schedule- rather than exposure-driven. Aerojet asserts that there is a substantial risk that implementation of the remedy will damage the groundwater resource and increase the time and cost required for remediation. Finally, Aerojet concludes that the remedy should be limited to wellhead treatment at existing production wells, and the removal of chemicals from groundwater at identified "hot spot" areas.

EPA Response: We do not believe that any of these complaints, criticisms, or assertions warrant a change in the proposed remedy. We summarize our response to these general comments here. More detailed responses follow to more than 250 specific comments that repeat the same complaints, criticisms, and assertions.

- Adequate hydrogeologic and contaminant data are currently available to select an appropriate response action. See Response F.

- Assertions that EPA's proposal does not address a portion of the aquifer exhibiting the highest concentrations of chemicals in groundwater are incorrect (the Wynn Oil well). EPA's proposed extraction and treatment in the upper area will address contamination detected at the Wynn Oil monitoring well in a cost-effective manner. See Response B.

- Speculation that the plumes in Subarea 3 have *stabilized* or *reached equilibrium*, and arguments that additional study is needed to justify remedial action in Subarea 3, are based on misinterpretations of data (e.g., mistakenly alleging oscillation and retraction of the plumes) and failure to consider site-specific evidence warranting action (e.g., increasing trends in contaminant concentrations). See Response A for a detailed explanation of the need for action in Subarea 3.

- Assertions that EPA's modeling efforts did not or cannot account for effects of pumping, recharge, or other local-scale details are incorrect. Computer simulations completed by EPA account for recharge and pumping in the Baldwin Park area, including at the Santa Fe Spreading Grounds and the Arrow/Lante well cluster/wellhead treatment facility. The statement by EPA that its CFEST model "cannot discern local-scale effects" refers to the limitation of the model to predict the exact location of a cone of depression of a pumping well or the impact of other perturbations on local water levels. This limitation results in part because the "nodes" in EPA's model do not always coincide with actual pumping locations. This limitation does not, however, affect the accuracy of predictions of the *regional* impact of existing or new extraction or recharge locations (e.g., the results presented in Figures 7-4 to 7-8) or significantly affect EPA's recommended extraction rates or locations. See response to comments Aj#143, Aj#144, and Response C.

- Assertions that EPA did not examine the potential remedial effects of recharge, and did not consider the effects of existing wells/wellhead treatment, are incorrect. See responses to comments Aj#145 and Aj#179.

- The assertion that EPA's proposed remedy will damage the groundwater resource is unfounded. Aerojet/ALR correctly point out that EPA's proposed remedy will allow more highly contaminated groundwater located north of the 210 freeway to spread into less contaminated areas, but fail to explain that the movement of more highly contaminated groundwater into less contaminated areas on its way to being drawn into extraction wells is a common limitation of groundwater cleanups, particularly when the area of contamination is large as in the Baldwin Park area. See Response B for additional details.

- Ignoring more than *ten years* of investigation efforts that began in earnest with EPA's Supplemental Sampling Program in 1985, Aerojet claims that EPA is moving too quickly to implement a remedy in the Baldwin Park area. Aerojet asserts that EPA's actions are *schedule-driven* rather than *exposure-driven.* More often, EPA has been criticized for moving too slowly, for studying rather than cleaning up the contamination.

Appendix (pp. 1-32)

Aj#2. "Figure 1-2 presents a misleading representation of the extent of groundwater contamination by VOCs. Contaminant concentration contouring at a smaller scale shows separate and distinct plumes in the Baldwin Park Area. In addition, the composite nature of the map artificially increases the extent of contamination by including isolated occurrences of chemicals (CTC) unrelated to the primary source chemicals (PCE and TCE). A response action based on this representation of contaminant distribution will not efficiently achieve stated project objectives."

EPA Response: We agree that the illustrated area of contamination may include, or at one time may have included, separate and distinct plumes. We disagree, however, with the assertion that EPA's decision not to show individual plumes results in a "misleading representation." As its title indicates, the purpose of Figure 1-2 is to show "Approximate Areas of Groundwater Contamination in the San Gabriel Basin." We further state that the Figure shows "only regional variability in contamination" (page 1-3) and a "simplified, smoothed" depiction of the extent of contamination" (page 3-9). Its purpose is not to show the precise locations of sources of contamination, nor to conclusively show whether the areas of contamination consist of one, two, or ten distinct plumes.

We disagree with the comment that the composite nature of the map artificially increases the extent of contamination. We see no reason to arbitrarily exclude from the Figure or give less attention to portions of the aquifer contaminated with carbon tetrachloride (CTC) above Federal or State drinking water standards. The remedial objectives of the Baldwin Park Operable Unit are to address the presence of all of the volatile organic compounds (VOCs) in the groundwater, not just the most prevalent contaminants TCE and PCE.

Limitations of the data available to prepare Figure 1-2, and guidelines to assist in its interpretation, are described in the caption on page 1-3 and in great detail on pages 3-9 through 3-23. The Figure is misleading only if interpreted in ways explicitly discouraged.

We agree with commentor that response actions should be based on an understanding and evaluation of raw or actual water quality and hydrogeological data; not on the interpreted representation provided in Figure 1-2 or any other figure.

Aj#3. "All three primary objectives as well as the secondary objective would best be accomplished by controlling plume migration in the source area of highest concentrations. This is not proposed in any of the alternatives."

EPA Response: We agree that containment is needed in source areas; the primary objective of groundwater extraction in Subarea 1 is source control. See Response B for a more detailed explanation of EPA's rationale for proposing groundwater extraction and treatment in both Subareas 1 and 3.

Aj#4. "It is misleading for the U.S. EPA to imply that implementation of the interim operable unit response action based on currently available data and interpretations will accomplish the stated objectives. Due to the significant hydrogeologic and water quality data deficiencies in the OU, there is serious risk that implementation of a premature response action would result in further damage to the groundwater resource and increase the time and cost required for effective remediation."

EPA Response: We disagree. The evaluations completed as part of the feasibility study indicate that EPA's selected remedy will not result in the types of negative impacts listed in the comment. This comment does not identify any specific data deficiencies; see Response F for a detailed response to assertions that EPA's proposal is not supported by adequate data or technical analysis.

Aj#5. "There is no description of "the limitations of wellhead treatment" in Section 6.1 as indicated. The only mention of wellhead treatment is in Table 6-2 where the few sentences in Section 1.2 are re-stated. Please elaborate."

Text included in Table 6-2 describes wellhead treatment as extracting groundwater and installing treatment only as needed to meet water supply needs.

The limitations of wellhead treatment are that, if left to themselves, well owners are likely to install treatment only at wells with contaminant concentrations just at or above Federal or State drinking water standards - five micrograms per liter (ug/l) for PCE and TCE; one-half ug/l for carbon tetrachloride. EPA's proposal calls for extraction of groundwater from areas where contaminant concentrations are higher: tens, hundreds, or thousands of micrograms per liter. Well owners are unlikely to install treatment and operate wells that are located in highly contaminated areas without EPA or other external involvement. In the FS, EPA therefore screened out wellhead treatment because it was incapable of fully satisfying EPA's remedial objectives.

There are existing wells in the Baldwin Park area where treatment has been installed or is planned. EPA expects that installation and operation of treatment at existing wells will contribute to, but not fully satisfy, EPA's remedial objectives for the Baldwin Park area.

Aj#6. "Since the LARWQCB is focusing on surface source control and vadose zone characterization, EPA is left with very little groundwater data to characterize the upgradient portion of the plume. There were only three monitoring wells in the entire OU prior to 1991."

EPA Response: As of September 1992, the date on which data were last reviewed during preparation of the Baldwin Park Operable Unit Feasibility Study, water quality data were available from approximately 22 monitoring wells installed in the Baldwin Park area. The well numbers are: V10AMMW1, V10VCMW1, V10VCMW2, V10VCMW3, W10NCMW1, W11AZW01, W11AZW02, W11AZW03, W11AZW05, W11AZW06, W11AZW08, W11AZW09, V10CAMW1, W10WOMW1, V10PIEW1, EPAMW611-619, EPAMW5101-5113, OSCOMW1, OSCOMW2, OSCOMW3, OSCOMW4, OSCOMW5. All but one or two of these wells are located in the upgradient portion of the plume. Commentor in fact notes the existence of slightly "less than 25 [monitoring wells]" in comment Aj#15. Additional data were obtained from water supply wells in the area.

The comment that only three monitoring wells were available in 1990 is misleading, since EPA's analysis is based on data through September 1992. Furthermore, the comment is incorrect. As of December 31, 1990, at least eight of the 22 listed wells had been installed: V10AMMW1, V10VCMW1, V10VCMW2, V10VCMW3, W11AZW01, W11AZW02, W11AZW03, V10CAMW1.

Aj#7. "It is stated that a purpose of the *OUFS* is "to evaluate remedial alternatives in sufficient detail to allow for the identification of a preferred remedial alternative. This study provides information that will be used in, but does not describe the results of, the decision-making process." In order for the public to conduct an independent evaluation of the *OUFS*, it is important that EPA describe the decision-making process which led to development of the alternatives considered in the *OUFS*. The description of this process in greater detail, is necessary to establish that a proper range of alternatives has been evaluated."

EPA Response: Section 11, pages 11-1 through 11-22, describes the logic behind, and evaluations made, in the development of the four alternatives evaluated in the feasibility study. Response B further describes the rationale behind the decision to propose groundwater extraction in two broad areas. Commentor asks for additional description of the decision-making process, but does not specify what details he/she wants.

Aj#8. "Although it is stated "It is not a goal of this *OUFS*, nor is it a realistic goal of any CERCLA FS to remove all uncertainty about site conditions or the performance of potential remedial actions", the reported simplifications regarding the current extent of groundwater contamination and absence of data regarding the response of contamination to changing pumping

and recharge patterns both historically and as a result of the proposed response action is significant, and can not be ignored. Failure to properly consider these factors prior to selection of a preferred response alternative will foster decisions that could exacerbate adverse impacts to the groundwater resource and present serious obstacles to effective management of the OU and development of effective remedial actions."

EPA Response: See Response F.

Aj#9. "The timing of the selection of a remedial alternative appears premature. Within the last year, data from new wells have revealed a different interpretation of contaminant distribution in the upgradient area of the plume. This information is mentioned in some sections of the report but have been largely ignored in many of the evaluations and development of alternatives. These recent interpretations are key to optimizing remedial actions, especially in Subarea 1."

EPA Response: We disagree that "new" data imply a different remedy than proposed by EPA. The so-called "new" data have not been ignored in the development or evaluation of remedial alternatives. The data were incorporated into the development of the subarea boundaries defined in Section 7. The subarea boundaries were used to determine approximate extraction locations, which form the basis for the remedial alternatives. See Response B for additional explanation of the extraction scenario in Subarea 1 (particularly on advantages and disadvantages of moving extraction locations closer to known or apparent sources).

Aj#10. "The first sentence implies that no action is occurring presently and that there is an immediate need to "reduce hazards". This is a misstatement since current activities are achieving many of EPA's objectives. Two pumping wells with wellhead treatment facilities in the upgradient portion of the OU have assisted in plume containment and contaminant removal in Subarea 2. In addition, production wells in the southwestern half of the OU have pumped more than 20,000 AF/YR resulting in additional plume containment."

EPA Response: We presume that the first part of this comment refers to Valley County Water District's Arrow/Lante well cluster. We are unclear how our statement of the need to "reduce hazards" implies that no action is occurring, but in any case we agree that operation of these wells does remove contamination from the aquifer. Operation of these wells was assumed in EPA's computer simulations used to develop recommended extraction rates and locations. See Appendix I and Response B.

Apparently, the production wells extracting 20,000 af/yr that are referred to in the comment are the active wells located downgradient of the more highly contaminated area; extraction within the more contaminated area is, as of December 1993, negligible. The 20,000 acre-feet per year of groundwater extraction apparently refers primarily to extraction from clean or relatively clean portions of the aquifer. As described on page 6-14 and in Response B, EPA's remedial objectives can only be satisfied by extraction from relatively contaminated portions of the aquifer.

In fact, as stated in the FS, there are remedial benefits to reducing production at existing water supply wells outside of the more contaminated areas, thereby reducing the hydraulic gradient.

Aj#11. "On the basis of the significant and critical data that are missing and necessary to effectively characterize the basic hydrogeologic conditions in the Baldwin Park area and distribution of chemicals within the local aquifer, there appears to be a high degree of risk that EPA will implement an interim action that will not be consistent with effective long-term remediation actions for the OU. Implementation of an improperly scoped and premature interim action is likely to increase both the time and cost necessary for a long-term and final response action for the OU. In fact, EPA's own strategy with respect to the Superfund Accelerated Cleanup Model (SCAM) [sic] is to consider groundwater remediation to be a long-term activity and not a candidate for early action."

EPA Response: We disagree; see Response F for a detailed explanation. Commentor does not explain the basis for the assertion that EPA's remedy will interfere with or not be consistent with long-term remediation and incorrectly interprets EPA's Superfund Accelerated Cleanup Model (SACM). The SACM calls for greater emphasis and public awareness for "removal actions" intended to address immediate threats to human health and the environment. The SACM encourages a streamlined RI/FS and in no way lessens the importance of or encourages unnecessary delays in addressing areas of significant groundwater contamination such as Baldwin Park.

Aj#12. "The statement "Groundwater contamination in the OU area is known to be spreading into less-contaminated and uncontaminated portions of the aquifer" is not substantiated based on the data and "simplified pictures" presented by EPA in both the *IRI* and *OUFS*. Data are sparse downgradient and available only from production wells with varying pumping histories and screen depths. No monitoring wells exist in Subarea 3.

In fact, available data indicates that the distribution of contaminants characterized to date is significantly influenced by groundwater pumping patterns that appear to be providing a component of hydraulic containment throughout the OU, and thereby controlling the migration of contaminants. Data indicate that no systematic increases in contaminant concentration are occurring downgradient of Subarea 3. EPA has failed to address this very fundamental relationship as it applies to characterization of the aquifer system and the development of candidate response actions."

EPA Response: We disagree with the first and last part of this comment which states that the data do not substantiate that contaminated groundwater continues to spread into less contaminated areas. Response A presents clear evidence of increasing trends in contaminant concentrations at selected downgradient wells and offers a detailed explanation of the need for action in Subarea 3.

We agree that the "simplified pictures" included in the FS do not justify remedial action. See response to comment Aj#2 and Aj#43. We also agree that pumping wells influence groundwater movement, but again note that existing wells are not suitably located to fully satisfy EPA's remedial objectives.

Finally, the comment that EPA has failed to account for the effects of pumping is incorrect. See response to comment Aj# 144.

Aj#13. "The statements that the available data "are sufficient to determine the approximate size and locations of the actions" and that "this interim action will not be inconsistent" with a final remedy, are premature and are not supported by a sufficient level of technical interpretations. Without a more thorough understanding of the complex hydrogeologic system and the present distribution of contaminants, any one of the candidate remedies could be inconsistent or adversely impact a final remedy."

<u>EPA Response</u>: This comment duplicates other comments. Again, we disagree. See Response F.

Aj#14. "Although EPA has performed three additional field investigations since mid-1989, these more recent groundwater investigations have sampled, with one exception (MW5-1), production wells. Water quality samples collected from production wells often produce results that are not characteristic of water quality at a particular location and depth due to the influences of prolonged extraction of large volumes of water."

<u>EPA Response</u>: We agree that production wells typically sample a larger volume of the aquifer than do monitoring wells, and are therefore representative of conditions in a larger portion of the aquifer than are samples collected from monitoring wells. This difference does not, however, preclude their use for determining the approximate extent of groundwater contamination. It in fact offers one advantage - a highly contaminated sample from a production well suggests that a significant vertical interval of the aquifer is contaminated.

It should be noted that a sample collected from a monitoring well also represents average water quality across the screened interval, and is not "characteristic of a particular location and depth." Monitoring wells in the Baldwin Park area typically have 40 - 75' screens.

EPA has also collected depth-specific samples from several production wells in the Baldwin Park area to provide more discrete information on vertical variations in contamination.

Section 3.2.2 and Figure 3-9 present some of this depth-specific data.

Aj#15. "Three wells shown on Figure 1-4 were apparently sampled by EPA yet no sampling results are included in Attachment A. These wells, 01900831, Z1000066, and 01902971 span the length of the plume and are important wells to consider for plume definition."

EPA Response: We did intend to include these data; they were inadvertently omitted from Attachment A. We apologize for any inconvenience. A printout of these results is included in the updated Attachment A included in the Administrative Record.

Aj#16. "The reference that to date only 15 facilities have been directed to investigate groundwater contamination in the OU is an example of the limited amount of detailed data available from an area that represents such a large portion of the basin. Of the more than 500 specific groundwater monitoring wells that exist in San Gabriel Basin, less than 25 are located within the OU and only one monitoring well exists outside of Subarea 1. A significantly greater level of detailed characterization will be necessary to support effective decision making in the Baldwin Park OU."

EPA Response: We believe that the data are adequate to support the selection of remedy for the Baldwin Park area. See Section 3 of the FS for a description of the available data. Also see Response F.

Aj#17. "If lithologic well logs were used to estimate hydraulic conductivities within the basin, why were data represented on Plates 1 through 6 not used to establish areal trends in hydraulic conductivity? A cursory review of well logs would suggest that higher hydraulic conductivities are present in the northern portion of the basin with decreasing values towards Whittier Narrows (south). This trend would be expected considering the depositional environment. The net effect of this discrepancy would significantly influence EPA's analyses regarding Subarea 3 conditions."

EPA Response: As described in EPA's Interim San Gabriel Basin Remedial Investigation Report (July 1992, included in the Administrative Record), the lithologic well logs were used to establish areal trends in hydraulic conductivity. And, as correctly stated in the comment, conductivity values do decrease towards Whittier Narrows. These decreases are accounted for in the San Gabriel Basin CFEST model. It is unclear what "discrepancy" is referred to in the comment that would influence EPA's analyses in Subarea 3. See Response C for additional detail on this topic.

Aj#18. "Aquifer tests at the Azusa Western Landfill were not specific capacity tests. Data from the pumping well are not available. The aquifer tests at the Azusa Western Landfill produced inconclusive results. A reliable hydraulic conductivity value cannot be determined from the data."

EPA Response: Commentor is correct that the Azusa Western Landfill tests were aquifer tests. Although EPA does not state that the Azusa Western Landfill tests were specific capacity tests, the organization of the text does leave that unintended impression. Although the results of these aquifer tests were inconclusive, they can be used to provide a rough estimate of the hydraulic conductivity in the area. In fact, the landfill's consultant (Law Environmental, Inc.) used aquifer test data to estimate hydraulic conductivity values of 5,000 ft/day in a north/south direction and 1,000 ft/day in an east/west direction ("*1990 Annual Report, Waste Disposal and Ground Water Monitoring, Azusa Land Reclamation Landfill, Azusa, California*", prepared by Law Environmental, Inc., January 28, 1991).

Aj#19. "EPA has not made available for public review the results of the "aquifer tests that yielded hydraulic conductivity estimates of 5,000 feet/day". It is our understanding that these tests were typically less than a few hours long and would therefore have produced results that are questionable. This information should be provided to permit an independent review of the "aquifer test" analysis and relative quality of the data."

EPA Response: Commentor refers to seven aquifer tests that yielded hydraulic conductivity estimates between about 270 and 5,000 ft/day.

We agree that there are limitations in how some of these data should be used. These data are from the initial round of well logging and depth-specific sampling conducted by EPA in the Baldwin Park area. The report summarizing these results is available for review; it is referenced in the Baldwin Park Feasibility Study (p.1-10) and included in the Administrative Record. The title of this report is "*Draft Technical Memorandum, Well Logging and Depth-Specific Sampling, San Gabriel Area 5 Remedial Investigation, San Gabriel Basin, Los Angeles County, California*, May 1990."

Aj#20. "Were the hydraulic conductivity values corrected for partial penetration? Were observation wells used in the tests? How do the results compare with recent Watermaster aquifer tests? When will the results from Watermaster tests be available to the public and for EPA to incorporate into their analyses?"

EPA Response: The estimated hydraulic conductivity values were not corrected for partial penetration. Some estimates were based on data obtained from observation wells; others were not. The lack of observation wells or correction for partial penetration do limit the accuracy of the results, but the error in the hydraulic conductivity estimates is likely to be less than a factor of two. The results have not been compared directly to recent Watermaster aquifer tests; the Watermaster should be contacted for information regarding the public release of their report.

Aj#21. "Why omit the CDWR aquifer tests from the discussion? CDWR conducted several pumping tests with observation wells in the OU. The paragraph implies that CDWR hydraulic conductivity estimates were based on lithology alone."

EPA Response: CDWR aquifer tests were considered in developing the hydraulic conductivity zones for the San Gabriel Basin CFEST model. (The paragraph was not intended to imply that CDWR estimates were based on lithology alone.) See Response C for additional detail on this topic.

Aj#22. "Groundwater flow directions assumed on the basinwide interpretations presented on Figure 2-4 and references to those provided in the *IRI* using CFEST are inappropriate for evaluating groundwater flow conditions on a localized scale such as for the Baldwin Park OU. Both of EPA's references fail to identify localized flow variations that are evident in the OU due to the effects of recharge, pumping patterns and seasonal influences. Failure to sufficiently characterize localized flow conditions in the OU limits EPA's ability to develop and evaluate cost-effective and technically-sound response actions. Significant localized and regional flow components that have been identified in the OU are not even generalized on Figure 2-4 of the *OUFS*. Water level contours are open-ended or not represented in the most critical area, Subarea 1."

EPA Response: As discussed in Response C, and shown in Figures 7-4 through 7-8, the CFEST model can and does identify local flow variations in the Baldwin Park area.

As stated in the text, Figure 2-4 is a reprint of water level contour maps prepared by Los Angeles County Department of Public Works (LACDPW) presented to illustrate regional flow conditions. As discussed on page 2-10, we agree that the LACDPW contour maps are of limited accuracy and lack detail on local conditions. Among the limitations of Figure 2-4 listed on page 2-10 is that "the map does not necessarily show local variability in water levels caused by pumping, recharge, or geologic faults... [and] aggregates measurements made over a 1- to 2-month period."

Aj#23. "The statement "no cones of depression appear in the OU area because of the relatively low pumping volumes and high hydraulic conductivity of the aquifer" is incorrect. Figure 2-4 contours water table elevations in increments of 25 feet, and in Subarea 1, 100-foot increments. Cones of depression would not be evident at this scale. Detailed groundwater contour maps of the OU prepared by Harding Lawson Associates (HLA) and others show that water supply production effects are prominent and can be readily depicted. The above statement also contradicts EPA's Table 7-3 (p. 7-28) that identifies average production from 1988 through 1991 for 16 wells operating in the OU at a total pumping rate over 35,000 acre feet per year. Other wells operating at similar pumping rates are also located in the OU. Please explain this wide disparity in the interpretation of groundwater flow influences in the OU."

<u>EPA Response</u>: The EPA statement should refer to *significant* cones of depression in the OU area. All pumping wells create cones of depression, but there are no *significant* cones of depression caused by large pumping centers such as those found near the mouth of Puente Valley and in the western portion of the San Gabriel Valley. In Figures 7-4 through 7-8, which show groundwater contours at increments of 1 foot, cones of depression for existing pumping wells are evident.

Aj#24. "The statement "Because the LACDPW contour maps are based on relatively widely spaced data, gradients estimated from these contour maps are uncertain estimates of the regional gradients. Local gradients are even less well defined", represents the significant lack of data on which EPA has based their OU decisions. In order to develop an effective response action, EPA will need to incorporate into their analysis the localized variations in horizontal hydraulic gradients that exist in the OU. HLA has identified that some of the steepest gradients in the basin exist in the OU due to recharge events at the Santa Fe Flood Control Basin."

<u>EPA Response</u>: EPA has incorporated localized variations in horizontal hydraulic gradients into its analyses. This result can be seen in Figures 7-4 through 7-8, which present the results of EPA's modeling performed to develop approximate extraction rates and locations for the remedy. Figures 7-4 through 7-8 also show steep gradients caused by recharge at SFSG.

Aj#25. "Seasonal variations in vertical gradient appear comparable in magnitude to typical absolute values of vertical gradient, implying a significant likelihood of vertical gradient reversal. To what extent has the element of seasonal variations in vertical groundwater gradients been further characterized in the OU, and was this component factored into the decision to justify the need for an interim response action?"

<u>EPA Response</u>: Seasonal variation in vertical groundwater gradients have not been further characterized in the Baldwin Park area. We do not know of any reasons why uncertainty about the precise magnitude of vertical gradients might lessen the justification for EPA's selected remedy.

Aj#26. "Vertical gradients in the Whittier Narrows area may not apply to this OU. Lithologic logs suggest a significant increase in the distribution of fine-grain sediments which can affect vertical gradients."

<u>EPA Response</u>: We agree that vertical gradients from Whittier Narrows would not likely be applicable to the Baldwin Park area. The text merely states that best sources of data in the San Gabriel Basin are from EPA monitoring wells in Whittier Narrows and Irwindale. Vertical gradients measured in Whittier Narrows are <u>not</u> provided or discussed on the page referenced in this comment (p.2-14).

Aj#27. "Would additional recharge along the unlined mile of Walnut Creek provide containment at the downgradient edge of the plume? Does the EPA groundwater model account for recharge in this area?"

EPA Response: Additional recharge along the unlined portion of Walnut Creek could reduce the gradient somewhat in Subarea 3. However, because this stretch is located more than one mile downgradient of Subarea 3, the effect will likely be fairly limited. In addition, recharge in this area would increase the groundwater flow velocity downgradient of this reach, thereby increasing the rate of contaminant migration towards Whittier Narrows.

The EPA San Gabriel Basin CFEST model does not account for recharge in this area. Typically, surface water flow rates and associated recharge are quite low in this reach.

Aj#28. "Recharge at the Irwindale Spreading Grounds (ISG) and other recharge basins drastically changes local flow patterns. EPA's CFEST simulations in Section 7 demonstrate the groundwater mounding at ISG during both dry and wet periods. How will an increase in recharge at the ISG affect contaminant concentrations and movement?"

EPA Response: An increase in recharge at Irwindale Spreading Grounds (ISG) will reduce gradients upgradient of the facility and increase gradients downgradient of the facility. The effect on contaminant movement would be similar (decreasing movement upgradient of the facility and increasing movement downgradient of the facility). As commentor notes, the results of CFEST simulations presented in Figures 7-4 through 7-8 show the impacts of recharge at the ISG for four specific clean up options.

Aj#29. "This is an important institutional change that can provide purveyor assistance in remedial actions."

EPA Response: Comment noted.

Aj#30. "What are the specific results of the modeling that suggest that purveyor practices may have caused only "a small fraction" of the increase in the areal extent of the plume and that "a continuation of past water management practices will increase the spread of contamination"? These statements suggest a continuation of past practices will be more damaging than past practices themselves. Why? Were remedial benefits resulting from some of the previous pumping patterns also identified during the modeling simulations? The results of these groundwater flow and transport simulations should be made available in order to permit the public to conduct an independent evaluation of the *OUFS*, and to justify EPA's decisions regarding the type of interim response actions that are proposed for the OU."

EPA Response: The simulations that suggest that a small fraction of the overall increase in the extent of contamination may potentially be attributed to purveyor practices are described in EPA's Basinwide Technical Plan (April 1990). The exact fraction attributable to purveyor practices is highly uncertain (estimated at 10% for the period 1980 to 1989). The Basinwide Technical Plan is referenced in the Feasibility Study and included in the Administrative Record.

The statements referenced in the comment both say essentially the same thing - that purveyor practices have and will, if unchanged, continue to contribute to the spread of contamination. It is unclear how these statements suggest that "a continuation of past practices will be more damaging than the past practices themselves."

Aj#31. "Well 08000076 appears to be approximately 200 feet deeper than the CDWR aquifer bottom yet doesn't penetrate bedrock. This discrepancy doesn't appear to be due to a cross-section projection problem since the well is very close to the line of section. Is this evidence that the aquifer bottom is at least 200 feet deeper than previously mapped?"

EPA Response: This well log may indeed be evidence that the aquifer is thicker than estimated by CDWR at this location. As shown on the cross-section, according to CDWR's contours, the alluvial aquifer thickens rapidly in the vicinity of this well and our understanding is that CDWR's contour map was based on fairly widely-spaced data points. Thus, it would not be surprising if CDWR's contour locations were somewhat off.

Aj#32. "Since sparse groundwater data are available from this OU, shouldn't non-CLP data be used to assist in the delineation of the subareas? Non-CLP concentrations are used very specifically in estimating influent chemistry yet not used in plume refinement. Further discussion on page 3-3 suggests that non-CLP data are reliable; what is the justification for its exclusion?"

EPA Response: Non-CLP data were used in preparing Figure 7-1. They were used to verify the Subarea boundaries. The "ALL DATA" listing in the Figure represents the average of CLP data and available non-CLP data.

The comment that non-CLP data are "not used in plume refinement" is incorrect. As stated on page 3-2, the area of contamination figures presented in Section 3 do incorporate non-CLP data.

Aj#33. "It is stated that "non-CLP chemical data from both LARWQCB and AB 1803 programs were used to describe the nature and extent of contamination and to estimate treatment plant influent chemistry, which in turn is used to develop treatment technologies and to estimate treatment costs for the remedial alternatives. For this use, the data do not have to be very precise because influent estimates from a single well have a relatively small impact on the treatment cost for a remedial alternative and would not likely result in a significant impact on the estimated bottom line cost of the remedial alternatives". It is particularly important that data which has undergone a high level of QA be used to identify and confirm the presence of contaminants of concern. Identified concentrations that will be used as influent to a treatment plant (design parameters) must be equally well scrutinized, as cost

impacts may be significant. These statements are supported by the fact that the compound vinyl chloride is listed in Table 8-1 (p. 8-8) as a controlling compound that is defined (p. 8-9) as "a compound that may control cost or limit the use of the recommended treatment method". It should be noted that vinyl chloride was not detected in any of the CLP data, and that it was only detected in one well specifically located in the OU (W11AZW01). The only reported occurrence of vinyl chloride in the OU is from non-CLP data available for one well in which vinyl chloride was detected sporadically from 1985 through 1989, and not detected again since that time. It is conceivable that a remediation system designed to treat vinyl chloride could be substantially over designed."

EPA Response: Comment noted. Commentor is correct that vinyl chloride has not been detected in CLP analyses, but there is no reason to doubt its presence. Vinyl chloride has been detected repeatedly at well W11AZW01 and in vadose zone samples elsewhere in Azusa. Part of the explanation for its absence in CLP analyses is that most samples collected from monitoring wells in the Baldwin Park area have not been analyzed through the CLP. Instead, they have been analyzed in accordance with Regional Board QA/QC requirements which, as noted on pages 3-2 and 3-3, are similar to EPA CLP requirements. Elevated detection limits in samples with high concentrations of other compounds may also mask its presence.

Aj#34. "The statement that "the data do not have to be very precise because influent estimates from a single well have a relatively small impact on the treatment cost for a remedial alternative" is misleading. Under the considered remedial alternatives water from only 1 or 2 wells would become influent to a treatment plant. It is critical that influent concentrations be predicted to the highest level of certainty using data of known quality."

We agree with commentor that the cited statement could be misleading. The statement is better rewritten as:

> "The data do not need to be as precise if groundwater from multiple extraction locations is blended at a centralized treatment facility, in which case water quality at a single well would have less impact on the treatment cost, and total cost, of a remedial alternative "

The conclusions made in the text remains valid, however (pages 3-3 and 3-4). The non-CLP data are believed to be of sufficient quality for use in estimating influent concentrations and verifying the contaminant subareas described in section 7.

Aj#35. "The data and statistics presented in Table 3-2 represent those for the entire San Gabriel Basin and are not specific for the Baldwin Park OU. Table 3-2 does not provide any purpose for decision making with respect to the OU. Instead, the public is required to sort through over 550 pages of laboratory data provided in Attachment A and search for similar comparisons of data for the Baldwin Park OU. Please reformat Table 3-2 or provide a supplemental

table to represent data and statistics that can be referenced specifically for the OU."

EPA Response: Table 3-2 was prepared for a previous EPA project, and is reprinted in the Feasibility Study to "give an indication of the widespread and varied nature of the contamination present in the San Gabriel Basin." Commentor's repulsion to this Table is noted. Summary statistics, including average and peak values, describing the nature and extent of contamination in the Baldwin Park area are provided in Table 7-4. Actual water quality data are included as Attachment A.

Aj#36. "The exclusion of data collected after August 1991 ignores data that are important to the characterization of the contamination in the OU."

EPA Response: Data collected after August 1991 were considered. Data up through September 1992 (the most up-to-date data available at the time an interagency draft Feasibility Study was completed) were used for the delineation of Subareas, as is shown on Figure 7-1. More recent data confirm the distribution of contamination shown in the Figures in the FS.

Aj#37. "While it may not be practical to collect data on a tight grid as at other Superfund sites, it is important to have sufficient data to characterize the contamination prior to remedy selection. Additional monitoring wells may suggest alternative remedial actions."

EPA Response: We believe that the data are adequate to specify a remedy. See Response F.

Aj#38. "Groundwater plumes are depicted on Figure 3-1 "assuming groundwater flow directions are fairly well understood", and inferring the direction and magnitude of groundwater flow without being "directly constrained by data". Because Figure 2-4 clearly represents a lack of understanding of groundwater flow patterns in the OU area, the depiction represented in Figure 3-1 that is unconstrained by water quality data is not technically defensible. The implications resulting from EPA's alternatives based on "assumed" flow directions "unconstrained by data" appears to be in violation with requirements set forth under the National Contingency Plan."

EPA Response: EPA believes that its remedy is technically defensible and meets all requirements of the National Contingency Plan, which calls for EPA to "assess site conditions and evaluate alternatives to the extent necessary to select a remedy." The NCP and common sense discourage unnecessary data collection.

Neither of the limitations identified by commentor limit EPA's ability to develop or select a remedy. Commentor offers the conclusion that the data are inadequate without specifying how the data limit EPA's ability to select an appropriate remedial action.

As described in Response C and in response to numerous specific comments, EPA possesses and has used knowledge of local flow conditions in the development and evaluation of remedial alternatives (see response to Aj#143). Figure 2-4 is a reprint of water level contour maps prepared by LADPW presented to illustrate regional flow conditions and does not represent any interpretation by EPA of groundwater flow conditions. The Figure is *not* used directly in the development or specification of the remedy.

As for the extent of contamination, commentor overstates the uncertainty and its impact on remedy selection. We acknowledge uncertainty about the precise extent of contamination, but believe that the data are sufficient to delineate areas of significant contamination warranting remedial action. As illustrated in Figure 7-1, the lateral boundaries of the Subareas identified for the OU <u>are</u> fairly well constrained by groundwater quality data.

Aj#39. "EPA's continued use of a multi-chemical composite contour map has created and is still creating a misleading impression regarding the continuity and interrelationships of areas containing chemicals in groundwater. Figure 3-1 should be deleted or replaced by a simple detected/not-detected boundary map."

<u>EPA Response</u>: This comment duplicates a previous comment. See response to comment Aj#2.

We also note that there are numerous ways to present data to illustrate the extent of groundwater contamination. We encourage commentor to prepare "detected/non-detected boundary maps" if he/she prefers that method of presentation.

Aj#40. "None of the iso-concentration maps include data collected over the last year. Recent data at several facilities in the upgradient portion of the plume significantly alter the iso-concentration lines shown on Figures 3-1 thru 3-6. As stated in paragraph 1, "relatively few monitoring wells have been installed and sampled in the OU area". Because so few data are available, all data from recent wells should be incorporated into this report."

<u>EPA Response</u>: Commentor is correct that some data collected after a cutoff date of fall 1991 were not incorporated into the "iso-concentration" maps presented as Figures 3-1 through 3-6, and Figure 11-8. Because new data are added to EPA's database on a continuous basis, cut-off dates had to be selected for various FS evaluations. The more recent data provide additional local-scale detail on the distribution of contamination but do not alter the generalized areas of contamination shown in the figures. Accordingly, EPA chose not to revise the figures in the final draft of the FS.

Data collected after fall 1991 (such as from a well installed at the Wynn Oil facility) were, however, considered in the development and evaluation of the remedial alternatives. The Wynn Oil data are included in the final draft of the feasibility study (Attachment A, VOC Sampling Results, ..., Site Assessment Wells) and were considered in the delineation of contaminant Subareas, identification of proposed extraction locations, and preparation of the Proposed Plan. The rationale for EPA's proposal to extract and treat groundwater in the "upper area" (as described in the Proposed Plan), rather than at the Wynn Oil facility or other possible source areas, is discussed in detail in Response B.

Aj#41. "If the time period May 31, 1990 to August 31, 1991 applies to all figures, then the TCE value for EPA MW-5 is outside this period and should be italicized on the figure (see legend). This should be the same for Figures 3-3 through 3-5."

EPA Response: Commentor is correct that data collected at well EPA MW-5 were collected in September 1991, after the stated cutoff date of August 31, 1991. The time periods noted in the captions to the Figures should be revised accordingly.

Aj#42. "If data from EPA MW-5 were incorporated on the figure but fall outside the time period, why weren't 1992 data also incorporated into the figures?"

EPA Response: The cutoff date of September 1991 was imposed to allow for preparation of the Figures in time for issuance of the first interagency draft of the Feasibility Study. EPA chose not to revise the Figures in the final draft since the generalized areas of contamination has not changed significantly.

Aj#43. "It is interesting to note [in figures 3-1 to 3-6] that the highest value of CTC occurs downgradient along a different flowpath than compounds shown in the other plume figures. This indicates a different source area/time and may suggest source locations outside of Subarea 1."

EPA Response: Not necessarily. CTC concentrations in groundwater in the 10 to 30 ug/l range have been detected at wells in all three Subareas, indicating the possibility of a source of CTC within Subarea 1.

We caution reviewers not to use the Figures 3-1 to 3-6 to reach conclusions about sources of contamination. As explained in response to Aj#2, Figures 3-1 through 3-6 provide a "simplified, smoothed" depiction of the extent of contamination"; they were not prepared to show sources of contamination, nor to conclusively show whether the areas of contamination consist of one relatively homogeneous area of contamination or distinct plumes.

Aj#44. "The statement "The shape and size of the downgradient extent of individual zones of contamination are typically inferred from the estimated direction and magnitude of groundwater flow and are in only a few cases directly constrained by data from wells" indicates the high level of uncertainty and lack of data regarding the distribution of chemicals in groundwater and the significant limitations of Figures 3-1 through 3-6."

EPA Response: This comment duplicates a previous comment. See response to comment Aj#38.

Aj#45. "Data used to construct Figures 3-1 through 3-6 represent maximum contaminant concentrations over a 15-month to 5-year period. Monitoring of individual wells in the OU area has shown substantial seasonal variations of VOC concentrations. The depictions, therefore, have limited accuracy."

EPA Response: We agree that there is often significant temporal variability in observed contaminant concentrations. This variability does not imply any lack of accuracy in the Figures; it implies only that the depiction of variability is not a purpose or proper use of the Figures. Numerous figures in Appendix B show how concentrations vary over time (see Figures B-2 through B-15).

Aj#46. "The total number of data points on Figure 3-1 are estimated, by EPA, to represent approximately "100 wells". The distribution of data points is too sparse to make the interpretations for an approximate 60-square-mile area of RI Area 5. Based on the limited number of data points per square mile, and total absence of data points for several square mile areas within RI Area 5 and the Baldwin Park OU, it is misleading for EPA to present the "simplified or smoothed over" depictions of large continuous areas of groundwater containing chemicals. Failure to recognize the separate and distinct areas of contamination within these large areas of groundwater contamination will foster the development and selection of inappropriate OU remediation alternatives."

EPA Response: This comment duplicates other comments. See response to comment Aj#2 on the use of Figure 3-1. See Response B on the extent to which the presence of separate and distinct areas of contamination would affect the remedy.

Aj#47. "Why were two different scales used for Figure 3-2 and Figure 3-1? For the purpose of comparing these two figures it would be beneficial to use the same scale for each figure, and to utilize a common scale for all similar figures."

EPA Response: Commentor is correct: the two Figures were prepared at different times with slightly different scales. We regret any inconvenience.

Aj#48. "Comparison of the distribution of concentrations posted for Figures 3-2 through 3-5 indicate separate and distinct source areas between Subareas 1 and 2 of the OU, however EPA has depicted one large continuous area of groundwater containing chemicals. The figures should identify the well recordation number along with the posted chemical concentration in order to facilitate an independent review of the data. Please substantiate the

rationale for grouping chemical concentrations together when they are interspersed between distances of over a mile in several locations on all of these figures? A clear set of guidelines used to construct these maps would facilitate review."

EPA Response: This comment largely duplicates other comments. See response to comments Aj#2 on the preparation and proper use of Figure 3-1.

We have prepared a revised figure (included as Figure RS-2) that includes well recordation numbers.

Aj#49. "Please discuss the merits of Figures 3-2 through 3-5 and their use in decision making for the *OUFS*. EPA has repeatedly referred to these figures as "cartoons and simplified approximations", and they are described as depicting "substantial uncertainty in the true location of the concentration contours. The boundaries between individual areas of contamination will probably change as new data are obtained and interpreted", (Figure 3-3 presents as few as 20 data points for the entire RI Areas, and fewer than 15 data points for the OU). These types of statements emphasize the necessity to obtain additional data in order to make cost-effective and technically defensible OU decisions. However, EPA showcases these figures in the *OUFS* as a primary tool on which to make decisions regarding the extent and distribution of chemical concentrations in groundwater, thereby directly influencing the development and selection of remediation alternatives."

EPA Response: This comment largely duplicates previous comments. See response to comment Aj#2. We emphasize again that these figures are presented to show "regional variability in contamination" (page 1-3) and a "simplified, smoothed" depiction of the extent of contamination" (page 3-9). They are not "showcased" or used as a basis for decision-making.

See Response F for a rebuttal to assertions that additional data are needed before remedy selection.

Aj#50. "It is stated that "no map of PCE contamination has been prepared because PCE concentrations are generally somewhat less than TCE concentrations." This statement is incorrect and again ignores the importance of identifying separate and distinct areas of contamination within the broad continuous area of groundwater depicted by EPA as containing chemicals in the OU. The highest concentration of all CVOCs detected in the OU was for the compound PCE (18,000 ug/l), in Well W10WOMW1 north of the 210 Freeway. The failure to identify these types of separate and distinct source areas within the OU, and failure to develop and select remedial alternatives to optimize the removal of chemical mass from this distinct area, will result in further damage to the groundwater resource and increase the time and cost required for effective remediation."

EPA Response: This comment largely duplicates previous comments. See Response B for an explanation of the rationale for EPA's proposal to extract and treat groundwater in the "upper area" (as described in the Proposed Plan), rather than at or near well W10WOMW1 or other possible source areas.

We agree that the local-scale distribution of PCE differs from other contaminants, but again emphasize that Figures 3-1 to 3-6 are presented to show generalized areas of contamination; they are not the basis for EPA's decision-making.

Aj#51. "In reference to the statements to Figures 3-7 and 3-8 that "the data provide a measure of the degree of variability in contaminant concentrations in the OU", and "concentrations have changed by several hundred ppb in a matter of a few months"; Has EPA evaluated factors such as recharge events, pumping patterns, and/or seasonal effects that are likely responsible for the referenced changes?. Please provide this information for the time periods shown on Figures 3-7 and 3-8 (e.g., the respective pumping rates for Well 08000060)."

EPA Response: EPA has evaluated "factors such as recharge events, pumping patterns, and/or seasonal effects." Although there does appear to be some correlation between certain factors, especially large recharge events, and contaminant levels at these wells during specific periods, there does not appear to be consistent, easily discernible patterns between any of the factors and contaminant levels. The large number of variables impacting these wells (e.g., pumping, recharge, spatial and temporal source variability) makes identification of specific relationships very difficult.

Amounts of groundwater pumped in each quarter are reported in annual Watermaster reports, included by reference in the Administrative Record (AR#404) and available from the Main San Gabriel Basin Watermaster.

Aj#52. "Has the sampling technique for these wells changed over time. If so, to what extent has this influenced measured concentrations."

EPA Response: The sampling technique for 08000060 has not changed over time. EPA is not familiar enough with the sampling techniques for ALR's monitoring well #1 (W11AZW01) to know if they have changed. Regardless, it is unlikely that any changes in sampling techniques would cause the types of variations apparent on Figure 3-7.

Aj#53. "The discussion on contaminant distribution changes implies that these changes could not be documented until the EPA 1991-92 sampling data. However, these shifts also can be seen in the 1985 data as well."

EPA Response: Commentor misinterprets the discussion on page 3-23. EPA neither believes nor implies that these changes could not be documented before 1991-92.

Aj#54. "The explanation of the plume shift emphasizes the controlling effects of pumping on the groundwater flow regime and contaminant concentrations. It also suggests that the plume would be in a different location and may be much narrower if no pumping occurred."

EPA Response: We agree that the movement of some areas of contaminated groundwater have been affected by pumping. We have seen no evidence, and commentor offers no evidence, that the area of contamination would be *much narrower* if no pumping occurred.

Aj#55. "Please describe the sampling procedures and protocol that were used to conduct the depth-specific sampling of the groundwater production wells. What was done to ensure sample isolation during depth-specific sampling of the production wells? How was it determined that no vertical flow was occurring?"

EPA Response: The technique does not involve isolating depth intervals but does require vertical flow. Sampling procedures are described in detail in *Sampling and Analysis Plan for Well Logging and Depth-specific Sampling of Wells*, November 9, 1990 (included in the Administrative Record as AR#181)

Aj#56. "It is not true that only seven wells in the OU penetrate below the upper 500 feet of the aquifer. According to various well construction tables published by the Main San Gabriel Basin Watermaster an additional 10 to 12 wells in the OU are screened below the upper 500 feet. One of these deep wells (08000076) is located near the northwest edge of the groundwater contamination as shown on Figure 3-1. Apparently this well has been sampled only once (1985). Data from this deep well and a shallow production well on the same facility to the southeast could provide northwesterly limits of contamination".

EPA Response: The comment is correct: there are more than seven wells. The text in the FS (p.3-26) should state that there are only seven deep wells in or adjacent to the more highly contaminated areas (where contaminant concentrations exceed 10 times MCLs).

EPA has obtained data from the listed industrial-use production wells, 08000076 and 08000075, but the submitter of the data has claimed that the data are confidential business information, attorney-client communication, and attorney work product that should not be publicly released. EPA is currently reviewing this claim (as of February 1994). If and when allowed by law, EPA will make this data available for public review.

Aj#57. "Depictions shown in Figure 3-9, although based on very limited vertical profile concentrations, emphasize the complex nature of vertical contaminant distribution. An incomplete understanding of vertical contaminant distribution could result in a remedy that exacerbates contaminant transport on the OU."

EPA Response: See response to comment Aj#58.

Aj#58. "Why has there been no attempt to define the vertical extent of contamination in the northern portion of the plume? The vertical distribution directly affects the remedial remedy."

EPA Response: EPA believes that data on the vertical distribution of contamination are sufficient to select a remedy, although additional data are needed for design. The FS includes recommendations for two new monitoring well clusters in the northern portion of the area of contamination to help further define both the lateral and vertical distribution of contamination (see Appendix E). Data obtained from these new wells will be used to determine precise extraction well locations, rates, and depths.

In response to this and other comments on the need for additional characterization of the extent of contamination in Subarea 1 (especially the vertical extent), EPA has reevaluated the recommended monitoring program. We recommend three additional monitoring locations in Subarea 1 as shown on the attached figure (Figure RS-3). These include a third monitoring well cluster and deeper monitoring wells installed adjacent to two existing monitoring wells in the area (W11AZW01 and W11AZW03).

Aj#59. "The interpretation of vertical distribution of contaminants on Figure 3-9 suggests that there are at least two separate plumes of TCE. The identification of microplumes is an important concept to remedy selection and may affect the location and depths at which groundwater is pumped. Can other microplumes be defined?"

EPA Response: The depiction of contamination illustrated in Figure 3-9 is just one of several interpretations that fit the available data. As discussed in response to previous comments, there are probably multiple groundwater plumes in the OU area. As discussed in Responses B, EPA does not believe that it is necessary or appropriate to define all of the "microplumes" before remedy selection. If additional data collected during the time of remedial design indicate the presence of specific plumes, these data will be considered in the determination of precise extraction locations and depths.

Aj#60. "The vertical distribution of contamination is unknown in both the deep and shallow (upper 500 feet) portions of the aquifer in large areas of the OU. Although EPA does not consider deep vertical characterization of the aquifer "essential to this interim action", the shallow vertical characterization is critical and should be addressed in more detail."

EPA Response: Significant characterization of the shallow groundwater has been carried out in Subarea 1. As of December 1993, more than 25 groundwater monitoring wells have been installed and sampled in Subarea 1. Most of these wells are currently sampled quarterly. Also see response to comments Aj#58.

Aj#61. "The *OUFS* speculates that four possible subsurface sources exist in the OU. These types of sources include dense non-aqueous phase liquid (DNAPL). There is no tabulation or interpretation of data used to support these conclusions. If such important conclusions are to be drawn substantiating

data should be provided. Based on data collected north of the I-210 Freeway, at least one "hot spot" has been identified. There is the potential for more groundwater to become contaminated from this source area. Groundwater extraction at the 10 and 13 clusters, more than 1-mile downgradient from this source area, will increase this possibility. If groundwater extraction is appropriate for an interim action in Subarea 1, it should occur at identified "hot spots"."

EPA Response: We refer the reader to EPA guidance listed in the Administrative Record (e.g., *AR#403, EPA/600/R-92/030)*), or to books or professional journal articles on contaminant fate and transport, for more information. It is widely-accepted that if released into the subsurface, relatively volatile contaminants such as trichloroethylene will exist in the gaseous, aqueous, and solid (sorbed) phases. As discussed in the FS, there is circumstantial evidence that residual contamination is also present in the subsurface in the Baldwin Park area as a pure, non-aqueous phase liquid (a "NAPL").

We assume that the "hot spot" north of the I-210 freeway referred to in the last part of this comment is well W10WOMW1, in which case the comment duplicates previous comments. See Response B for a discussion of the advantages and disadvantages of moving extraction locations to the vicinity of well W10WOMW1.

Aj#62. "Although a discussion of PCE, TCA, and TCE degradation is presented, no interpretation of Baldwin Park OU data is provided. Such interpretations are necessary to support the contention that degradation processes are both active and predictable. This "textbook" discussion is not referenced to site specific data and therefore is of little usefulness in conceptualizing or evaluating remedial alternatives."

EPA Response: The "textbook" discussion is presented for readers unfamiliar with degradation processes. As commentor's subsequent comments note, the FS includes a discussion of site-specific data beginning on page 3-35.

Aj#63. "Please provide the specific data that supports the speculation regarding the presence of anaerobic conditions in the OU."

EPA Response: EPA does not have specific data that support the presence of anaerobic conditions in the OU area. We note, however, the presence of the Azusa Land Reclamation Landfill in Azusa (ALR) and that anaerobic conditions are fairly common in the vicinity of landfills. ALR's consultant also believes, as stated in its "*1990 Annual Report, Waste Disposal and Ground Water Monitoring, Azusa Land Reclamation Landfill, Azusa, California*" (prepared by Law Environmental, Inc., January 28, 1991), that landfill gas is present in the vicinity of one of its monitoring wells (MW-1) and that degradation of TCE to 1,1-DCE is likely occurring.

Aj#64. "Please provide the specific data that supports the speculation regarding the presence of aerobic conditions in the OU."

EPA Response: EPA does not have specific data that support the presence of aerobic conditions in the OU area. However, given the physical conditions present in the OU area (alluvial aquifer with an overwhelming majority of coarse-grained materials, unconfined conditions, high permeability, relatively high groundwater-flow rates, and recharge of large volumes of surface water in the vicinity), it is very likely that aerobic conditions are prevalent at least in the upper portions of the aquifer throughout most of the OU area.

Aj#65. "The explanations should include the fact that these products are or were historically used in consumer products, too."

EPA Response: We agree that some chlorinated solvents have and continue to be used in consumer products, but note that the amounts used in consumer products have typically been much less, and often insignificant, in comparison to the amounts known to have been used by industrial facilities in the OU area.

Aj#66. "The discussion of the Wynn Oil facility reveals contaminant concentrations orders of magnitude higher than seen in other OU wells. Why were these data ignored in the discussion of chemical distributions, remedy selection, and on Figures 3-1 through 3-6?"

EPA Response: This comment duplicates previous comments. As stated in response to comment Aj#40, the data were not ignored.

Aj#67. "Another possibility for the increase of 1,1-DCE is the downgradient movement from sources to the northeast. An upgradient well east of the facility [ALR] detected the highest concentration of 1,1-DCE in the area."

EPA Response: It is true that upgradient sources of 1,1-DCE could possibly be the cause for the increasing 1,1-DCE. However, based on the timing of the increase and associated decline in TCE, degradation may be a more likely scenario. A combination of the two factors is also possible. As discussed in the response to comment Aj#63, ALR's consultant believes that it is likely that TCE is degrading to 1,1-DCE at this location ("*1990 Annual Report, Waste Disposal and Ground Water Monitoring, Azusa Land Reclamation Landfill, Azusa, California*", prepared by Law Environmental, Inc., January 28, 1991.

Aj#68. "When concentrations of 1,1-DCE began to increase in this well (W11AZW01), concentrations of PCE also increased dramatically. Since PCE is a more chlorinated solvent than TCE, this increase is inconsistent with the hypothesis of biodegradation."

EPA Response: The increase in PCE is much less "dramatic" than the increase in 1,1-DCE, and PCE concentrations subsequently decreased. An increase in PCE concentrations is not necessarily "inconsistent" with the hypothesis of degradation. There are many factors that impact the concentrations observed at the wells, including the location and nature of (particularly variability in) the contaminant source.

Aj#69. "It is unclear why discussions of facilities that are not within the geographic boundaries of the OU are included in the text. These discussions provide little or no assistance in quantifying degradation of chlorinated solvents."

EPA Response: The purpose of the discussion is to briefly examine whether biological degradation of CVOCs may be occurring in the OU area; not to quantify its rate. To accomplish this task, we selected facilities where deep vadose zone and groundwater investigation work had been completed and where the investigation had verified the presence of potential degradation products (dichloroethane, dichloroethene, or vinyl chloride). We knew of only two facilities in the OU area which met these criteria (as of mid 1992); therefore the evaluation was expanded to include three other facilities in the San Gabriel Basin. Subsurface conditions do differ in different portions of the Basin, but evidence of degradation outside of the OU area is relevant to its potential in the OU area.

Aj#70. "Figures 3-11 and 3-12 indicate that nitrate concentrations greater than the MCL are probably already present in portions of the OU."

EPA Response: Comment noted.

Aj#71. "In what wells did depth-specific sampling of nitrate occur? Were data complete enough to identify a potential high-nitrate zone?"

EPA Response: Figure 1-4 in the FS lists the wells in the OU area where depth-specific sampling occurred. Depth-specific nitrate samples were collected from all of these wells. As stated on page 3-44, nitrate concentrations appeared to be fairly uniform across the upper 400 to 500 feet of the aquifer.

Aj#72. "Radon is not listed in Table 4-2, however it is included in Tables 11-5 and 11-6. The exclusion of radon from Table 4-2 implies that there are no chemical-specific "applicable" requirements for this chemical. A TBC level of 1.5 pCi/L for radon is listed on Table 4-3, however a "treatment objective" of 300 pCi/L is listed on Tables 11-5 and 11-6. It is assumed that this objective is based on the proposed MCL; this value is therefore considered to be a TBC. The basis of the number used as the treatment objective should be discussed in Section 4, and clearly identified as a TBC."

EPA Response: Commentor is correct that the basis of the 300 pCi/L treatment objective for radon is the proposed MCL (as stated on page 8-10 as part of the discussion of treatment process options) and that until completion of the Record of Decision this objective is a "To Be Considered" (TBC).

Aj#73. "How was the water from EPA pumping tests discharged? Was the water from spinner logging and depth sampling discharged to a storm sewer, recharge basin, or discharged directly to the surface?"

EPA Response: Groundwater pumped during EPA-sponsored spinner logging and depth-specific sampling of wells in the Baldwin Park area was discharged either to a local water distribution system (well numbers 08000060 and 01900031) or to nearby flood control channels either by pipe or through storm drains (well numbers 01900882, 71903093, 01900029, 01900035, and 08000093). The pumping rates, volumes, and quality of water discharged are described in the following two documents:

> "Sampling and Analysis Plan for Well Logging and Depth-Specific Sampling of Wells, San Gabriel Area 5 Remedial Investigation. Prepared for EPA Region IX by CH2M HILL. September 5, 1990."

> "Technical Memorandum, Well Logging and Depth-Specific Sampling, San Gabriel Area 5 Remedial Investigation. Prepared for EPA Region IX by CH2M HILL. December 2, 1991."

The rationale used to select the method of discharge is described in:

> "Draft Technical Memorandum, Disposal Alternatives for Water Generated During Well Logging, Depth-Specific Sampling, and Wellhead Sampling, Area 5 Remedial Investigation, San Gabriel Basin. Prepared for EPA Region IX by CH2M HILL. January 28, 1991."

All three of these documents are included in the Baldwin Park Operable Unit Administrative Record (Administrative Record Numbers 181, 203, and 276).

Aj#74. "The requirements for aesthetic qualities of treated water should be similar to those for uncontaminated water that currently goes into the purveyor's distribution system."

EPA Response: Comment noted.

Aj#75. "Sufficient information in Subarea 3 are not available to "demonstrate that action is necessary to stabilize the site.."

EPA Response: We disagree. See Response A for a detailed response to the *plume stabilization* and *plume equilibrium* hypotheses offered by the San Gabriel Basin Industry Coalition as reasons for delaying action in Subarea 3.

Aj#76. "All chemicals reported as detected in the OU have been included as chemicals of potential concern (COPCs) in the risk assessment. EPA has outlined specific suggestions for selecting COPCs in the *Risk Assessment Guidance for Superfund* (*RAGS*; EPA, 1989); none of the EPA approaches to identify COPCs were incorporated in this *OUFS*. These include, but are not limited to the following: a. Elimination of chemicals that were detected infrequently (e.g., less than 5 percent); b. Comparison of common laboratory contaminants (e.g., methylene chloride, acetone) in site-specific samples to laboratory and field blanks. These chemicals would be retained as COPCs only if the concentration in the site sample exceeds 10 times the maximum concentration detected in any corresponding blank sample.

Applying the above rules would eliminate at least ethylbenzene, methylene chloride, and xylene(s) as COPCs. Insufficient information is available on blank data to assess whether acetone would also be eliminated as a COPC. Please explain the rationale for not following the *RAGS* protocol?"

EPA Response: The methodology used in the Baldwin Park Feasibility Study to select COPCs is consistent with EPA guidance. The "specific suggestions" referred to in EPA's Risk Assessment Guidance (RAGs) are optional approaches offered if the number of COPCs is so large as to make the risk assessment unreasonably burdensome (see RAGS, page 5-20). The number of chemicals evaluated in the risk assessment was reasonable and manageable; nothing would be gained by eliminating any of the chemicals.

Also, there is no justification for eliminating methylene chloride or acetone as COPCs. These chemicals can result from laboratory contamination during sample analysis, but in the Baldwin Park area both acetone and methylene chloride are known to have been widely used by industry as raw materials and solvents.

Aj#77. "The data set chosen for analysis in the risk assessment included only the CLP data, even though other data also exist for the OU. The use of a data set of only 1 year's duration can sometimes significantly change the estimated exposure concentrations, the COPCs selected for analysis (because additional data can allow elimination of more chemicals as COPCs, based on frequency of detection), and resulting risks, compared with for example the use of a data set for a 3-year duration. The uncertainties associated with use of a selected data set should be discussed in further detail."

EPA Response: Only CLP data were used in the risk assessment because these data are of known, high quality. Inclusion of non-CLP data would not, however, significantly change the risk estimate. Inspection of Figure 7-1, which summarizes both CLP and non-CLP data, indicates that the chemicals detected and their average concentrations during the specified time period do not differ significantly.

Aj#78. "It is unclear why "nondetects" from upgradient wells were removed from the data set prior to conducting the statistical analysis. Removal of these data results in the prediction of higher average and 95 percent upper

confidence limit (UCL) estimates in the OU. Please substantiate this approach."

EPA Response: "Nondetects" from one well (V10AMMW1) and the lower depth intervals of a second well (EPA 5-1) were not used to estimate exposure to contaminated groundwater. The use of nondetects from these two wells or from any of the hundreds of other wells located in clean areas of the San Gabriel Basin would misleadingly decrease the exposure estimate, in effect diluting the known areas of contamination. The purpose of the risk analysis is to estimate the risk resulting from exposure to contaminated groundwater, not to estimate the obviously insignificant risk from clean portions of the aquifer.

Aj#79. "Additional specific information is needed to assess the approach used in estimating exposure point concentrations for the risk assessment. It is stated in RAGS that a well-by-well analysis should be conducted to estimate chemical concentrations in groundwater for the purposes of the risk assessment. It is stated in the OUFS that the data evaluation conducted for the risk assessment significantly reduced the estimated exposure point concentrations used in the analysis; it is unclear without additional information and a detailed data evaluation whether or not this is actually the case. Please provide the information necessary to conduct an independent analysis of the methods used."

EPA Response: EPA guidance explicitly recommends using average values for the concentration term in Superfund risk assessments (see OSWER 9285.7-081, May 1992, included in the Administrative Record). Commentor is incorrect in stating that RAGS requires a well by well analysis.

We are unclear what additional information the commentor requires; we believe that the FS provides all data needed to estimate exposure concentrations and explains the methodology clearly. Table 5-2 lists individual water quality results; text on page 5-9 explains how the analytical results were analyzed; and Table 5-3 presents the results of the analysis.

Aj#80. It is unclear whether the statistical analyses were conducted with proper regard to elevated detection limits (if applicable; no discussion was found in the text). The EPA default approach of applying one-half the CRQL for all nondetects was used in the analysis. Use of one-half an elevated CRQL can sometimes increase the exposure point concentration estimates significantly, and, with very potent carcinogens, can make an important difference in the results of the risk assessment.

EPA Response: Inspection of Table 5-2 (which lists detection limits for all samples) indicates that detection limits were not elevated. They are less than or equal to 1 ug/l for all analyses.

Also, the approach used in the risk assessment was to assume one-half the *detection limit* (not one-half of the *CRQL*) if a chemical was not detected in a particular sample.

Aj#81. "Please provide detailed information on the statistical approach used in the analysis, so that an independent review of the assessment can be conducted. Some of the results of the statistical analysis appear to be of concern. For example, as shown on Tables A-1 through A-4 (Appendix A), concentrations for many of the COPCs were predicted to be the <u>same</u> for both the average and 95 UCL concentration, raising questions about the use of elevated detection limits, robustness of the data set, etc. In addition, as shown in Table 5-3, the standard deviation for TCE is quite high (e.g., average concentration of 55.1 - 107.8 mg/l), indicating high variability in the data set for this chemical. This standard deviation seems to indicate high uncertainty in the "actual" average and 95 UCL concentrations. Since TCE is the risk "driver" for the OU, a change in the concentration data, and/or the assumptions used to develop these concentrations could dramatically affect the results of the risk assessment."

<u>EPA Response</u>: The expression of "concern" for the results of the statistical analysis is unfounded. As described in response to the previous comment, detection limits are not elevated. Nor is the absence of a "normal" distribution or the level of variability in the data unusual for environmental sampling; we believe that it does not warrant additional or more sophisticated analyses.

We agree that a higher concentration estimate, particularly for TCE, would change the risk estimate. The impact of assuming a higher TCE concentration is easily predicted, however. If the peak TCE concentration from all of the sampled water supply wells (450 ug/l) were used in the risk estimate rather than the 95th UCL (96.9 ug/l), the RME risk estimate would increase from 7×10^{-5} to approximately 2×10^{-4}.

Aj#82. "EPA (1989) indicates that the lower of the maximum concentration and the 95 UCL should be used to represent the exposure point concentration for the reasonable maximum exposure (RME) scenario. No discussion was found in the text concerning this; more information (i.e., maximum detected chemical concentrations) is needed to ensure that the lower of the two values was used in all cases."

<u>EPA Response</u>: Maximum concentrations are easily determined from a visual inspection of Table 5-2. A comparison of Tables 5-2 and 5-3 shows that the 95th UCL is lower than the maximum concentration for all contaminants, with three exceptions. The exceptions are benzene (UCL=0.5; maximum=0.5J), ethylbenzene (UCL=0.5; maximum=0.4J), and methylene chloride (UCL=0.5; maximum=0.2J). The risk resulting from exposure to the three contaminants listed as exceptions does not contribute measurably to the total risk estimate.

Aj#83. "The lower of the state and federal MCLs for each COPC is listed in Table 5-3; these values include proposed MCLs in several cases. The document should clearly outline which of these chemicals are considered TBCs, and which are considered to be "applicable" ARARs. In addition, existing MCLs for each of the chemicals with a proposed MCL should be presented, if available."

<u>EPA Response</u>: The values listed in Table 5-3 are State or Federal MCLs. All are ARARs. No proposed MCLs are listed. See Table 4-2 for a complete list of State and Federal MCLs.

Aj#84. "Because the lower of the chemical-specific state and/or federal MCLs is considered to be an ARAR for that chemical in groundwater in the Baldwin Park OU, it was unnecessary to retain all chemicals as COPCs for evaluation in the risk assessment. Using a preliminary screening of 95 UCL chemical concentrations against the lower of the state and/or federal MCLs listed on Table 5-3, the following chemicals could be dropped from the risk assessment, as they are less than the MCL: 1,1,1-TCA, 1,1-DCA, benzene, chloroform, ethylbenzene, methylene chloride, toluene, trans-1,2-DCE, and xylene(s)."

<u>EPA Response</u>: This comment duplicates a previous comment. See response to comment Aj#76.

Aj#85. "Exposure point concentrations were estimated assuming that the data set was normally distributed. More often than not, environmental data are lognormally distributed, indicating that use of the arithmetic mean and the upper 95 percent confidence limit of the arithmetic mean (95 UCL) may not appropriately represent the data set. Rather, the use of the geometric mean and its corresponding 95 UCL may be more appropriate to represent groundwater concentrations in the OU. Depending on the methods used in data compilation, statistics, and data evaluation, the use of the geometric mean can reduce "assumed" average and RME chemical concentrations by up to several orders of magnitude. This reduction can dramatically decrease risks predicted in a risk assessment. Methods to assess the normality of the data set are readily available, and are commonly applied at NPL sites. These methods should be used for assessing the normality of the data set, and the results of this analysis should be used in estimating exposure point concentrations for use in the risk assessment."

<u>EPA Response</u>: We disagree that additional analyses of the distribution of the data are needed (i.e., normal, log-normal) or that the risk estimate should make use of a geometric mean. EPA guidance (see OSWER 9285.7-081, May 1992, included in the Administrative Record) specifically recommends use of the arithmetic mean "regardless of ... the type of statistical distribution that might best describe the sampling data." The guidance further states "The <u>geometric</u> mean ... bears no logical connection to the cumulative intake that would result from long-term contact with site contaminants..."

Aj#86. "In estimating exposure point concentrations, groundwater data from the entire OU was used, without regard to the location of existing municipal or water purveyor wells. Alternative methods for use in a risk assessment include estimating potential health effects on an area-specific basis (e.g., generating health risk isopleths for the entire area, to reflect the significant differences in chemical concentrations distributed throughout the

OU; conducting the risk assessment with consideration of current wellhead concentrations, rather than an estimated average or 95 UCL; use of well-by-well data, as stated above), etc. Risk assessments conducted on an OU basis increase the uncertainty of the assessment, and oversimplify the complex conditions in the distribution of groundwater contaminants. A risk assessment considering the differing concentrations throughout the OU could be useful in both defining the "actual" risk (e.g., from wellheads currently in use), would more appropriately define the potential future risk in each area, and would be useful in helping define specific areas possibly needing remediation."

EPA Response: We agree that more complicated methodologies could be used to estimate concentrations, but believe that they are unnecessary. The conclusion of the risk assessment, that remedial action is warranted in portions of the aquifer contaminated above drinking water standards, would not change.

Aj#87. "The risk assessment used an average daily drinking water intake value of 2 L/day; this value should be 1.4 L/day, based on 50th percentile adult ingestion rates provided in the Exposure Factors Handbook (EPA, 1990)."

EPA Response: Use of 2 L/day is consistent with U.S. EPA Region IX recommendations. Page 9 of the *Risk Assessment Guidance for Superfund Human Health Risk Assessment, U.S. EPA Region IX Recommendations* (Interim Final, 12/15/89) states: "The traditional default values of 2 L/day water ingestion ... should be used for both "Average" and "Reasonable Maximum" scenarios in Region IX risk assessments. This deserves special notice since national guidance is to use intake assumptions from the Exposure Factors Handbook, which presents different average values." The guidance is included by reference in the Baldwin Park Administrative Record (AR#403).

Aj#88. "The inhalation slope factor for TCE has recently been reduced from 0.017 to 0.006 $mg/kg/day^{-1}$ as recommended by EPA's Office of Health and Environmental Assessment (EPA, 1992). Although the text indicates that the new slope factor was used in the analysis, Tables 5-5, A-1 and A-2 indicate that the old slope factor of 0.017 was actually used. The TCE risks should be recalculated using the new slope factor, and the FS and community relations fact sheet should be updated to reflect this change."

EPA Response: The first statement, that the inhalation slope factor for TCE has been revised, is correct. The revised, provisional value, 0.006, was not used in the Baldwin Park OU risk assessment since it was published after the risk assessment was completed.

The second sentence in the comment is incorrect. The text (p.5-17) and the Tables all indicate that the old, unrevised value, 0.017, was used.

Use of the revised slope factor would not affect EPA's decision to take action or the scope of the action. Commentor presents the impact of this change in comment Aj#92.

Aj#89. "In addition, TCE (which may be on a continuum between a possible and probable human carcinogen [EPA, 1992]) has not been assigned either an inhalation or ingestion reference dose (RfD) on IRIS. Thus, the information on Tables 5-5, A-3, and A-4, which present an RfD and the calculations of noncarcinogenic health effects from exposure to TCE, should be corrected. A value of 0.006 was erroneously listed on these Tables as an RfD, rather than as the slope factor for the chemical."

EPA Response: The RfD of 0.006 listed for TCE is correct. This provisional oral RfD value was derived by EPA's Environmental Criteria and Assessment Office. A copy of an EPA memorandum documenting the RfD is included in the Administrative Record. The memo is from Joan Dollarhide to Stan Smucker, dated 4/13/92.

Aj#90. "In the characterization of potential health risk, chemicals considered to be known or potential carcinogens should be combined using the carcinogenic weight of evidence (WOE). EPA (1989) recommends that Group A carcinogens should be summed separately from B1, B2, and C carcinogens. Thus, risk characterization results should be separately presented for each of the four WOE categories, rather than summing all four categories. In the risk assessment, all carcinogens were summed as if they were all "known" human carcinogens, without consideration of the WOE. Please revise the risk assessment accordingly to follow EPA's protocol for risk characterization (*EPA, 1989*)."

EPA Response: The method used in the Baldwin Park OU risk assessment is consistent with and explicitly described in EPA guidance (RAGs). RAGs states:

> "The cancer risk equation for multiple substances sums all carcinogens equally, giving as much weight to class B or C as to class A carcinogens."

Aj#91. "Based on the erroneous RfD used for risk characterization, the resulting hazard quotients (Tables 5-6, A-3, and A-4) of 0.25 and 0.44 *for* average and RME cases (for both ingestion and inhalation exposures), respectively, should be deleted and replaced with zeros in each case. In addition, the resulting hazard index is changed significantly by this mistake; previous results indicated total noncarcinogenic hazard indices of 1.0 and 1.8 for average and RME scenarios, respectively (Tables A-3 and A-4). New hazard indices of 0.5 and 0.92 for average and RME, respectively, are calculated when this mistake is corrected. While the initial results indicated that there may be a concern for toxic effects from the noncarcinogenic chemicals in groundwater, the results of this change indicate that noncarcinogenic health effects are NOT expected from the presence of these chemicals (using the assumption that a hazard index greater than 1.0 indicates that adverse impacts may occur; *EPA, 1989*). "

EPA Response: Commentor is incorrect in asserting that EPA used an erroneous RfD. As noted in response to comment Aj#89, EPA properly assumed an RfD of 0.006 for TCE. The hazard quotients of 1.0 and 1.8 remain valid.

Aj#92. "Similarly, the risk characterization results for hypothetical cancer risks from exposure to TCE were also calculated incorrectly. As indicated

above, the revised slope factor of 0.006 mg/kg/day^{-1} should have been used in the analysis; when this change is made, currently listed TCE risks are reduced to 1 x 10^{-6} and 7 x 10^{-6} for average and RME exposure scenarios, respectively."

EPA Response: Commentor is correct that the slope factor for TCE has been revised downward from 0.017 to 0.006 mg/kg/day^{-1}. Use of the revised slope factor would not affect EPA's decision to take action or the scope of the action.

Aj#93. "Although the text has a detailed discussion of the environmental species that are present in the Santa Fe Dam area (pp.5-22 to 5-27), only one statement linking potential environmental exposures with groundwater concentrations was found. This sole reference cited an average concentration of less than 1 ug/l PCE and TCE in Well 08000070, used to fill the recreation lake. No surface water data are presented in the *OUFS*, and therefore considering the volatile nature of PCE and TCE, there is a strong possibility that no environmental exposures are occurring."

EPA Response: We agree.

Aj#94. "Groundwater injection wells and aquifer recharge via surface discharge should be incorporated into Table 6-1 as general response actions to control contaminant migration (hydraulic containment)."

EPA Response: Comment noted.

Aj#95. "Table 6-2 Table 6-2 contains a common mistake. In Situ Treatment and Water Use are not really GRAs that address the response objective. They are just parts of potential groundwater extraction alternatives; analogous to choosing a turbine versus a submersible pump. That is, they are just process options. Similarly, aquifer recharge should be separated from water use because it is most commonly combined with groundwater extraction to affect hydraulic containment, a "general response action".

EPA Response: In situ treatment is presented as a General Response Action since many in situ treatment methods (e.g., passive funnel and gate systems) do not involve groundwater extraction. Still, we appreciate the suggestions on alternative ways to present the results of the response action/technology screening process.

Aj#96. "In-Situ Treatment - The comment in the applicability column on by-products suggests that the only in-situ method considered was biotreatment. Was air sparging considered? The aquifer and vadose zone are sufficiently permeable and the predominant chemicals are volatile. Since the constituents of concern do not biodegrade easily under aerobic conditions, by-products are not a concern. The problems with groundwater extraction, including water disposal issues, warrants a more detailed evaluation of other options."

EPA Response: See Response E for a detailed evaluation of air sparging.

Aj#97. "Groundwater Extraction - Although extraction may remove high levels of VOCs, the effectiveness is location dependent. If the remedy is focused solely on migration control, the Table shows that a downgradient location is preferable. However, if the well is downgradient, the "yes" in the removal column changes to a "no"."

<u>EPA Response</u>: We agree that effectiveness is location-dependent. We note that a well located at and within the downgradient end of contamination could achieve both objectives of migration control and removal of high-level of contamination.

Aj#98. "When a relatively small area of very high concentrations are known to exist as in this OU, extraction is more logically located there to remove the high levels and prevent their migration downgradient. Only then should both columns on Table 6-2 [for the "groundwater extraction entry] contain a "yes" response."

<u>EPA Response</u>: We are unsure of the "relatively small area of very high concentrations" to which commentor refers. As pointed out in response to other comments, the number of monitoring wells are too few to define individuals plumes. See Response B for a discussion of the alternative approaches for locating extraction wells in areas with multiple sources.

Aj#99. "Groundwater Extraction - According to the table, groundwater extraction with the wellhead treatment option is not capable of removing high levels of contamination or providing a degree of migration control. This is incorrect. A wellhead treatment system on a production well with relatively high concentrations <u>will</u> remove high levels of contamination. If pumping is sufficient, it may also provide a degree of containment. A well does not have to pump continuously to <u>assist</u> in migration control. Contaminants that begin to migrate past the influence of a pumping well may be "recaptured" when pumping resumes."

<u>EPA Response</u>: We agree that treatment systems installed on production wells with relatively high concentrations will remove high levels of contamination and will, if suitably located, contribute to migration control. We also agree that intermittent pumping can contribute to migration control.

Aj#100. "The note in the applicability column states that "(E)xisting downgradient wells are not optimally located for migration control". However, 2 of the 3 proposed extraction locations in Subarea 3 are existing downgradient wells."

<u>EPA Response</u>: We agree. The text in the FS should state that existing wells are not suitably located to fully satisfy EPA's migration control objective.

Aj#101. "Please provide the rationale to support EPA's decision to not include optimizing mass removal of chemicals from the aquifer to compliment the OU "migration control" objective. Current data indicates the presence of separate and distinct source areas of chemicals in the OU that if continued to be ignored, will further degrade aquifer conditions and increase the cost and time necessary to implement effective migration control and aquifer

remediation measures. HLA's independent analysis of aquifer conditions indicates that a source control action which maximizes mass removal action could compliment migration control, and thereby further optimize the remedial response objective for the OU."

EPA Response: Mass removal is an objective of the Baldwin Park OU. See Response B for additional details on how the remedial objectives of migration control and mass removal will be translated into extraction rates, locations, and other project details.

See Response B for additional explanation of EPA's strategy for addressing known or suspected source areas.

Aj#102. "EPA's primary response objective is stated to be "migration control", with "mass removal" as a secondary objective. The LARWQCB has a parallel responsibility to affect "source control". Based on the goal of selecting a remedial alternative that is compatible with the final remedy, and based on the fact that migration control may at least be in place through production, the most effective way to control migration may be to reduce the source term. Therefore "source control" or maximizing "mass removal" should be considered objectives equivalent to "migration control" or should be combined into a single response objective for the OU."

EPA Response: We agree that the remedy for the Baldwin Park area should address the sources of the contamination. The extraction and treatment facilities included in Subarea 1 in the selected remedy will "reduce the source term" by limiting the impact of any residual surface or subsurface contamination on portions of the aquifer downgradient of the Subarea.

We are unclear of the impact, if any, of restating or re-ranking the two remedial objectives of migration control and mass removal as suggested in the comment. Instead, we present in Response B guidelines for translating the remedial objectives into extraction rates, locations, and other project details.

Aj#103. "The remedial response objective of inhibiting contaminant migration from highly contaminated areas is currently being achieved through production well pumping in Subarea 3. This objective could also be achieved in Subarea 1 by groundwater extraction from the most highly contaminated area upgradient from the proposed extraction wells. Proposed extraction clusters are more than 1-mile downgradient from these high concentrations."

EPA Response: There is no evidence to support the assertion that production well pumping in Subarea 3 is achieving EPA's remedial objectives in the Subarea. See Response A for a detailed response to this *plume stabilization* or *no migration* hypothesis.

Also see Response B for explanation of EPA's proposed pumping configuration.

Aj#104. "Please provide the rationale to conclude that "the remedy will be optimized in size and configuration for migration control rather that mass removal". The optimization process should balance migration control and mass removal objectives. A "balanced" response objective that would optimize the "time- and cost-savings" provided by an OU interim action should be incorporated."

<u>EPA Response</u>: The decision to make migration control the primary objective of the Baldwin Park OU is consistent with EPA regulations and guidance and experience at other contaminated groundwater sites. See pp. 6-1 through 6-13 for references to relevant EPA regulations and guidance. Also see response to comment Aj#102 and Response B which presents guidelines for translating the remedial objectives into extraction rates, locations, and other project details.

Aj#105. "It is implied that EPA's interim action will resolve the items cited as "Reasons Not to Delay Action". Please explain how the interim action will resolve each of the five items discussed on pages 6-11 through 6-12."

<u>EPA Response</u>: As stated in the Proposed Plan, EPA's selected remedy would:

- Limit further migration of highly contaminated groundwater into less contaminated and uncontaminated portions of the aquifer [reducing the potential for human exposure];
- Reduce, but not necessarily eliminate, the need for water purveyors with wells in the Baldwin Park area to install treatment
- Reduce the cost and difficulty of operating existing treatment facilities by preventing highly contaminated groundwater from reaching existing facilities
- Reduce the likelihood that future increases in contaminant concentrations at active water supply wells will result in "emergencies" requiring immediate actions such as relocating wells to clean areas
- Reduce the eventual cost, difficulty, and time required for complete cleanup of all or portions of the aquifer. (If no action is taken, continued contaminant migration would result in the need to treat larger volumes of contaminated water and may result in the increased presence of vinyl chloride or other CVOC degradation products that are more difficult to treat or more toxic than the parent compounds)

Aj#106. "The statement "Groundwater contamination in the OU area is known to be spreading into less contaminated and uncontaminated portions of the aquifer", has not been substantiated by a technical evaluation of available data commensurate with the importance of this conclusion."

<u>EPA Response</u>: We disagree. See Response A.

Aj#107. "As noted in previous sections in this document, the downgradient part of the plume is not well defined. Current pumping and wellhead treatment will provide a measure of containment downgradient and permit time to continue needed investigations in this area. This would ensure that the area is properly characterized before money is spent unnecessarily."

<u>EPA Response</u>: Current pumping is inadequate to meet EPA's remedial objectives. This conclusion is supported by the evaluation of the "no action" alternative included in Section 12 of the FS. Also see Response A for discussion of the (limited) value of conducting additional investigations before selection of a remedy.

Aj#108. "Please explain EPA's conclusion that "the partitioning of more contaminant mass from the dissolved to the sorbed phase" would occur in the aquifer [p.6-12]. Since partitioning is an equilibrium driven process it is unclear how time will increase contaminants sorbed to aquifer materials."

<u>EPA Response</u>: As contaminated groundwater moves into clean or less contaminated areas, additional contaminant mass would partition from the dissolved into the sorbed phase.

Aj#109. "After reviewing EPA water quality data and LARWQCB files, no facility in the OU has been found where concentrations of DCE, DCA and vinyl chloride increase with time. Vinyl chloride has only been detected in a few wells in the entire OU. Most of the detections were random, one-time hits at low concentrations."

<u>EPA Response</u>: As stated in the FS, the text does not refer specifically to facilities in the OU area. (The last paragraph on p.6-12 reads: "At numerous facilities *in the San Gabriel Valley*...") In addition, the text does not state that DCE, DCA, <u>and</u> vinyl chloride are increasing. It states that concentrations of "DCE, DCA, <u>or</u> vinyl chloride increase with time."

There is only one facility in the OU area with a long enough data record to evaluate changes in vinyl chloride concentrations with time. At this facility (the ALR landfill), trends at one well do indicate that landfill-influenced degradation may be occurring.

Aj#110. "In order to evaluate the issue of biodegradation, existing trends should be examined. The lengthy discussion in Section 3 only explains the concept and presents summary data on potential degradation products from two OU facilities. Water quality data should be analyzed over time to see what conclusions can be made regarding the regional groundwater flow regime."

<u>EPA Response</u>: We agree that additional evaluations are possible. Also see response to comment Aj#69.

Aj#111. "A cursory review of all of the detections presented on EPA's concentration maps of potential degradation compounds in Section 3 reveals that an overall increase in degradation products is <u>not</u> occurring. Of the 15 wells that have recently detected 1,2 DCA or 1,1 DCE (Figures 3-4 and 3-5), there are no wells that have increasing trends of both compounds over the last

5-years. Less than 20 percent of the wells contain increasing trends for either of the two compounds. Attachment A data indicate that there has been only one detection of vinyl chloride (2 ppb) in the OU area in the last few years."

EPA Response: An overall increase in all degradation products would not necessarily be expected even if biodegradation is occurring. Given the complex contaminant distribution in the area (probably numerous sources and plumes), degradation may be occurring at different rates along different degradation pathways in different areas depending on local conditions (both source-related conditions and physical conditions).

It is not clear how the determination that both 1,2-DCA and 1,1-DCE are not increasing at any wells impacts an evaluation of degradation. As shown in Figure 3-10, these two compounds are not in the same degradation sequence and would not be expected to both be increasing for degradation of a given plume or contaminant source.

Aj#112. "In the case of this OU, additional monitoring may be necessary in order to propose a remedial action."

EPA Response: This comment duplicates previous comments. As stated previously, we do not believe that additional monitoring is needed before remedy selection. See Response A for additional details.

Aj#113. "Continued pumping or increased pumping at selected water supply wells can also inhibit contaminant migration. Watermaster's institutional authority can assist in achieving EPA objectives."

EPA Response: We agree.

Aj#114. "This paragraph [p.6-14, paragraph 2] very effectively describes the concept that should be applied to groundwater extraction in the OU. Both mass removal and migration control can be achieved through extraction at the source area(s) where concentrations are the highest. Why not propose extraction north of I-210 Freeway where concentrations of some compounds are orders of magnitude higher than other wells in the OU."

EPA Response: This comment duplicates previous comments. See Response B for a detailed response. We note that concentrations of some contaminants in the Baldwin Park area south of the I 210 freeway are the same order of magnitude as concentrations north of the I210 freeway. For example, 9,800 ug/l PCE was measured at MW-3 at the Aerojet facility (5/93), versus concentrations as high as 32,000 PCE at W10WOMW1 (8/93). The difference is a factor of three, not "orders of magnitude."

Aj#115. "Please provide the documentation and describe the results of the "bench-scale ozone/hydrogen peroxide study that was completed using

groundwater from the OU area and Whittier Narrows." This important study should be available for public review."

EPA Response: The results of this work can be found in two papers referenced in the FS, both by Bellamy, William, et al (1989 and March/April 1991). The 1991 article is available in the *Research Journal, Water Pollution Control Federation,* Volume 63, Number 2.

Aj#116. "Please provide the definition and significance of use of the term "assimilable" organic compounds."

EPA Response: The term "assimilable" is defined as "capable of being assimilated." Assimilable organic compounds (AOC) are compounds that can be converted by microorganisms into protoplasm and assimilate into their cell mass. The amount of these compounds present in the ozonated water is higher than in the untreated water.

Aj#117. "The last sentence of this page [p6-25] is unclear. Should it read "GAC filter [or?] through biological degradation"?"

EPA Response: The referenced sentence is correct as written. To some extent, the granular activated carbon (GAC) filter will become biologically active. Because the listed compounds are readily biodegradable, they can be effectively removed by even this limited biological activity.

Aj#118. "Aquifer recharge can help control contaminant migration only if recharge occurs at a desirable location."

EPA Response: We agree. Also see response to comment Aj#179.

Aj#119. "The effects of increased spreading on contaminant transport must be fully evaluated prior to remedy implementation."

EPA Response: EPA believes that it has completed adequate evaluations of the impacts of recharge to support the selection of remedy. Also see response to comments Aj#179

Aj#120. "As stated in the document, a combination of treatment processes may be the most cost effective. Where are technology combinations evaluated in this document?"

EPA Response: See Section 8 for an evaluation of two combinations of treatment technologies (treatment technology trains): air stripping followed by liquid phase carbon, and Advanced Oxidation Processes followed by liquid phase carbon. Section 8 also includes a discussion of the potential merits of two-stage air stripping (p.8-41).

Aj#121. "Treatment facilities currently exist in the basin. The Main San Gabriel Basin Watermaster and the San Gabriel Water Quality Authority, as well

as individual water purveyors have been active in the design and installation of wellhead treatment facilities in this OU. Data from these installations would provide practical information on specific treatment technologies, operating problems, and costs. Were these data used in the development of remedial actions? Why were they not referenced in the section on technology screening? Were they considered in the cost development?"

<u>EPA Response</u>: The experience of water purveyors and the San Gabriel Basin Water Quality Authority were considered during the development of remedial alternatives. They confirm EPA's conclusions that either air stripping or liquid phase carbon may be effective technologies depending on the precise mix on contaminants. Data from existing San Gabriel Basin treatment facilities were not used in the cost evaluation since contaminant concentrations differ from those expected in EPA's selected remedy. Contaminant concentrations influence carbon usage, which is one of the biggest contributors to operating costs. Nor were local data used to "identify specific designs or O&M problems."

It may be worthwhile to complete an up-to-date evaluation of the performance of existing treatment facilities in the San Gabriel Basin during remedial design, but it is not necessary or appropriate as part of the remedy evaluation and selection process.

Aj#122. "Please provide the details of the evaluation referenced in the statement "Through an evaluation of the available groundwater quality data in the OU area, three subareas within the larger OU area have been identified between which there appears to be a significant change in contaminant concentrations.""

<u>EPA Response</u>: This statement is further explained in the descriptions of each of the three Subareas on pp. 7-2 through 7-6. Also see Response B for additional discussion of the importance of the Subareas.

Aj#123. "The dividing line between Subarea 1 and 2 is arbitrary. A more precise representation would be to identify small hot spots as Subarea 1 and include the other Subarea 1 wells in an expanded Subarea 2. Over time, Well W11AZW03 (Subarea 1) and Well 1900034 (Subarea 2) have had very similar total VOC concentrations. Similarly, data from other wells in Subarea 1 (omitted from Figure 7-1) demonstrate that total VOC concentrations do not change significantly from Subarea 1 to Subarea 2. For example, the average total VOCs for all data presented in Subarea 2 on Figure 7-1 is 450 ppb. This is very similar to other wells in Subarea 1 that are omitted from the map yet have similar LARWQCB data (W11AZW01 = 387 ppb, W10NCMW1 = 446 ppb)."

<u>EPA Response</u>: The primary distinction between Subareas 1 and 2 is that within the boundaries of Subarea 1 there appear to be significant and multiple sources of the groundwater contamination. This interpretation is based on information on the magnitude and duration of chemical usage, handling, and disposal, and on the magnitude, extent, and pattern of

contaminant concentrations in soil, soil gas, and groundwater at industrial facilities in the Subarea.

In their comment, Aerojet/ALR compare Subareas 1 and 2 based on average CVOC concentration. This comparison does not, as claimed, demonstrate that CVOC concentrations do not change from Subarea 1 to Subarea 2. Data presented in Section 7 and other comments submitted by Aerojet/ALR demonstrate significantly higher concentrations in Subarea 1 than in Subarea 2 (although in comment Aj#125, Aerojet/ALR prefer to label the higher concentrations as *anomalous*). Instead, the comment highlights the important point that Subarea 1 probably includes multiple sources and plumes of contamination separated by less contaminated areas, and is not a homogeneous area of contamination. We also note that comparisons of concentrations between wells must account for differences between wells in their spatial relationship to the original spill or release, and differences in construction. A well located at the centerline of a plume will show a higher concentration than a well located at the fringes of the plume. Differences in construction are evident in a comparison of wells installed at three different facilities. Wells W11AZW01 through W11AZW09, for example, have much longer screen lengths than the Aerojet wells or well W10WOMW1. The screen lengths for wells W11AZW01 through W11AZW09 exceed 200 feet; the screen lengths for the Aerojet wells and well W10WOMW1 are 50 and 30 feet respectively.

Commentor also recommends redefining Subarea 1 to include "small hot spots." See Response B for a more detailed response to this and other comments on the delineation and use of the Subareas.

Aj#124. "There are more than five facilities being investigated in Subarea 1."

<u>EPA Response</u>: We agree, and do not state or imply otherwise. The FS mentions five facilities *with groundwater monitoring wells* located in the area of contamination (as of 9/92).

Aj#125. "There were 20 monitoring wells in Subarea 1 at the time of report publication. In contrast, there are only four wells in Subarea 2. Except for 2 small areas in Subarea 1 where concentrations are anomalously high, total VOC concentrations are similar throughout both subareas."

<u>EPA Response</u>: This comment largely duplicates a previous comment. See response to Aj#123 and Response B.

Aj#126. "The implication that 1,2 DCA and 1,1 DCE concentrations are higher in Subarea 1 is incorrect. Approximately 90 percent of the areal extent of 1,2 DCA as shown on Figure 3-4 is in Subarea 2 with the maximum concentration near the Subarea 3 boundary. Although the higher concentrations of 1,1 DCE are in the downgradient portion of Subarea 1, the majority of the plume is located in Subarea 2 (Figure 3-5)."

EPA Response: The first sentence of this comment contends that 1,2-DCA and 1,1-DCE concentrations are not higher in Subarea 1 than in the other Subareas. However, the third sentence of the comment contradicts this by correctly pointing out that the highest concentrations of 1,1-DCE are found in Subarea 1. Recent sampling of monitoring wells at the Aerojet and Wynn Oil facilities has confirmed that the highest concentrations of 1,2-DCA present in the OU area are found in Subarea 1.

The second and third sentences of this comment discuss the extent of contamination in the Subareas. It is unclear how these statements are related to the magnitude of contamination being discussed in the referenced text from the FS.

Aj#127. "Contradicting the statement that "Subarea 2 is located downgradient of the main suspected source area", review of the chemical data on Figure 7-1 indicates that the highest concentrations of chemicals in the OU have been detected in Wells W10WOMW1 and V10VCMW1, north of the Foothill Freeway (210). The southern terminus of Subarea 1 shown on Figure 7-1 is 1.5- to 2-miles downgradient of these identified "hot spots", respectively. Please explain why the area north of the Foothill Freeway was not identified as a separate Subarea."

EPA Response: This comment largely duplicates previous comments. See Response B for additional explanation of EPA's recommended extraction scenario in Subarea 1, particularly on the advantages and disadvantages of delineating additional subareas (i.e., adding or moving extraction locations closer to wells W10WOMW1 and V10VCMW1).

We also note that contaminant concentrations indicative of residual subsurface sources are present not only at the two wells mentioned in the comment, but extend to within about one-half mile of the southern boundary of Subarea 1 (as far south as well OSCOMW2).

Aj#128. "It is also probable that chemical concentrations in Subarea 2 are the result of "local" sources less "favorably" located with respect to existing wells that have been sampled. Why are so few monitoring wells shown on Figure 7-1?"

EPA Response: The small number of monitoring wells in Subarea 2 reflects the small number of possible sources of contamination in the Subarea. It is possible that there are significant sources of groundwater contamination located in Subarea 2, but investigation efforts to date indicate that most, and perhaps all, of the significant sources are located in Subarea 1. Source identification efforts have been extensive; the Regional Water Quality Control Board has sent chemical use questionnaires to more than 1,600 facilities and inspected more than 600 facilities throughout the Azusa/Irwindale/Baldwin Park area.

Aj#129. "Although it is stated that "available data do not show any significant change in contaminant levels from just downgradient of Subarea 3 to as far south to Whittier Narrows", unsubstantiated contradictions regarding chemicals migrating downgradient of Subarea 3 are made throughout the *OUFS*. This unsubstantiated contradiction also serves as EPA's basis for a response action in Subarea 3. Please explain this disparity. The paragraph also implies (incorrectly) continuous chemical concentrations all the way to Whittier Narrows."

EPA Response: We see not contradiction between these two statements:

> Statement (i): *there is not a significant change in contaminant levels from just downgradient of Subarea 3 to as far south as Whittier Narrows*
>
> Statement (ii): *contaminated groundwater continues to spread into less contaminated areas*

Statement (i) results from the observation that contaminant concentrations at various wells in the interval from just downgradient of Subarea 3 to the Whittier Narrows area are generally at or near MCLs. No significant changes in contaminant concentration are apparent within this interval, in contrast to the difference between contaminant concentrations *in* Subarea 3 and concentrations *downgradient* of the Subarea. We agree with commentor that the concentrations in this interval are not necessarily "continuous."

Statement (ii) results from a variety of evidence discussed in detail in Response A.

We also note that EPA is planning remedial action in Subarea 3 to satisfy two objectives: migration control and mass removal.

Aj#130. "The vertical extent of contamination in Subarea 1 is unknown. Available groundwater data confirm VOCs in the 400- to 500-foot depth range at one location in Subarea 2 only. If the contamination is shallower at extraction locations then groundwater need not be extracted from such a deep interval. This could result in fewer wells and/or lower pumping rates which would lower costs substantially."

EPA Response: We agree that extraction wells should be designed to remove contaminated groundwater only from contaminated vertical intervals.

Aj#131. "Although it is stated that "Extraction near wells with existing data ensures that, at a minimum, migration of known high-level contamination will be inhibited", review of Figure 7-2 does not show the location of an extraction well cluster at the data points shown on Figure 7-1 where the highest concentrations of chemicals in the OU have been detected (in Subarea 1 at Wells W10WOMW1, V10VCMW1, and OSCOMW2). The closest extraction well clusters (10 and 13) to these two data points are located 1- to 2-miles

downgradient. The concentrations of PCE and TCE detected in W10WOMW1 represent the presence of the most significant source of chemicals identified to date in the OU. Failure to address the removal of VOCs from this location during the interim action will result in further degradation of the aquifer, further complicate, and increase the time and cost for long-term aquifer remediation in Subarea 1."

EPA Response: This comment duplicates other comments. See Response B.

Aj#132. "This figure [7-2] shows seven recommended groundwater extraction well locations. These locations were selected on "downgradient margins of the three subareas", and at "locations where existing water quality data are available". No further rationale is given to support selection of well locations. These two selection criteria are inappropriate measures to achieve an optimal extraction array and to substantiate the high magnitude of cost for such a large-scale response action. Wells should not be located at the margins of geographically defined subareas or any other artificially conceived boundary. Additionally, extraction locations should be selected based on an interpretation of available data, using a well defined groundwater model, not at locations of groundwater quality. A considerable amount of additional analysis and thought should go into the selection of these well locations."

EPA Response: We agree with the latter part of this comment that extraction locations should be based on water quality data and modeling. They are. (See Section 7.1.1.) As the comment notes, EPA has located *approximate extraction areas* at the downgradient margins of the Subareas. The Subareas were delineated primarily based on water quality data. (Other information that helps identify sources of contamination were also used - see Response B.) Logically, it follows that extraction areas are based on water quality data. These *approximate extraction areas* have been identified without the use of computer modeling.

EPA's recommendations for precise extraction locations and rates (in contrast to the *approximate extraction areas* delineated using water quality data) are based on the Subarea boundaries and on computer simulations using EPA's groundwater flow model to identify the most efficient combination of extraction rates and locations within the *approximate area of extraction*. A specific combination of extraction rates and locations is referred to as a *pumping configuration*. There are an unlimited number of possible pumping configurations that could be implemented in each approximate exaction areas. See Response C for additional details on EPA modeling efforts.

It is therefore difficult to understand why the commentor refers to the Subareas as "artificially conceived boundaries" and criticizes EPA's selection criteria as inappropriate. Also see Response B for additional explanation on the delineation and use of the Subareas.

Aj#133. "Data from Well V10WOMW1 [sic] with the highest concentrations in the OU (>1000x MCLs) are omitted from Figure 7-2 and the discussion on extraction locations. These data are listed on Figure 7-1. The areal extent of contamination would have been interpreted differently if these data were considered and should have influenced the location of the proposed extraction."

<u>EPA Response</u>: We disagree. (We presume the comment refers to well W10WOMW1, not to V10WOMW1.) Data from well W10WOMW1 are included in Figure 7-1 and were considered in the our interpretation of the extent of contamination, and in determining Subareas boundaries and approximate extraction areas. The omission of well W10WOMW1 from Figure 7-2 is irrelevant; Figure 7-2 was not used for these purposes.

Aj#134. Reference is made to the statement "to the extent possible, the remedial alternative will make use of existing water supply wells. However, there are at most, only three existing production wells in or near the OU area of contamination that are optimally located. Table 7-1 describes these three existing wells." (p.7-8) Please describe and provide the results of the evaluation that was completed to make this conclusion.

<u>EPA Response</u>: EPA's information on well locations in the San Gabriel Basin has been obtained from the Main San Gabriel Basin Watermaster and individual water purveyors. The three wells listed in Table 7-1 are those wells optimally located at the downgradient end of the three Subareas to satisfy EPA's migration control objective.

There are other water supply wells located in the OU area, but in less than optimal locations. These wells, which include the Arrow/Lante and San Gabriel Valley B6 wells, are shown in Figures 7-1 and 7-2.

As noted in Appendix I, the continued operation of the Arrow/Lante wells (on which wellhead treatment has been installed) was assumed in EPA's computer simulations completed to determine extraction rates and locations. The impact of these wells is visible in Figure 12-2 (in Subarea 2) and described on p.12-8.

Aj#135. "Why are existing production Wells 08000060 and 01900034 (presented on Figure 7-1 with accompanying chemical data) not identified in Table 7-1? These existing wellhead treatment facilities that are strategically located in the OU are already contributing to the remedy. These wells provide a degree of migration control while removing some level of contaminant mass. Were these wells considered in the evaluation of extraction location and quantities?"

EPA Response: See response to previous comment.

Aj#136. The statement that "The number and capacity of new wells are based on computer simulations" implies that extraction locations are based on groundwater modeling. This statement contradicts EPA's insistence that "extraction locations are not based on groundwater modeling." Please explain.

EPA Response: There is no contradiction, but some additional explanation of the distinction made in the FS between *approximate areas of extraction* and *precise extraction rates and locations* is necessary. See response to comment Aj#132.

Aj#137. "As implied earlier in the report, the EPA groundwater model may not be an appropriate tool for conducting these evaluations. On the top of page 7-6, EPA states that "the extraction locations...could be optimized using a more discrete model of the OU area...". Since the extraction locations, influent chemistry, interval to be screened, and quantities pumped are yet to be optimized, how can reasonable costs be generated and compared with alternative remedies?"

EPA Response: The goal in a Superfund feasibility study is to prepare costs estimates that are no more than 50% above or 30% below true costs. EPA believes that the uncertainty in these parameters is low enough to allow this goal to be met.

Aj#138. "Please provide the results of the evaluation referenced in the statement "In addition to the simulations, a hydrogeologic evaluation of the aquifer has been performed to help estimate maximum extraction rates for individual clusters (p7-11)."

EPA Response: The evaluation is summarized in the text on p.7-11 which states:

> "Typical specific capacity values from existing wells in the OU area range between 100 and 450 gallons per minute/foot (gpm/ft). This indicates that, assuming a drawdown of 50 feet, between 5,000 and 22,000 gpm could be extracted from a single well or well cluster."

We are unclear as to what additional details commentor seeks.

Aj#139. "What was the basis for "assuming a drawdown of 50 feet"?"

EPA Response: Fifty feet of drawdown was assumed as a reasonable maximum drawdown value that would not result in excessive pumping costs.

Aj#140. "How was an initial extraction rate of 38,500 gallons per minute (gpm) derived? What rationale was used to select this rate and other rates presented in Table 7-2? How was the zone of influence determined?"

EPA Response: The initial extraction rate of 38,500 gpm was simply an "educated guess" based on previous simulations performed during the initial development of remedial alternatives. Rates for the subsequent simulations were based on a review of the groundwater contour maps shown in Figures 7-5 through 7-8 of the FS. The zone of influence was manually approximated by drawing capture zones for each well based on the simulated groundwater contours (as shown in Figure 7-5 of the FS).

Aj#141. "Because capture zones are not shown on all the figures, and for all time periods, it is not possible for the reader to comprehend how varied extraction rates affect groundwater capture. Additionally, it is more difficult to comprehend seasonal (temporal) variations in the flow regime."

EPA Response: We have added capture zones to Figures 7-5 through 7-8. They are included in this Responsiveness Summary as Figures RS-4 through RS-7. We have also added capture zones to Figure 12-2; the revised Figure is included as Figure RS-8.

Aj#142. "The method of establishing extraction rates for the three subareas is based on the need to provide capture for the entire geographical area of all subareas combined. Based on discussions in Section 7.1, these Subarea boundaries were established as a geographical convenience, and concentrations are "not uniform" within the subarea. These Subarea boundaries are not linked to a specific water quality criteria or concentration. It is therefore inappropriate to use these geographical boundaries as required limits of groundwater capture."

EPA Response: This assertion in this comment that the Subareas are *geographic conveniences* not linked to water quality concentrations is incorrect, and duplicates previous comments. See response to comment Aj#132.

Aj#143. "Review of the "Base Case" simulations presented on Figure 7-4 show the influence of recharge from the ISG and the associated effects on the groundwater regime, however, all simulations fail to quantify the significantly greater influence of recharge from the Santa Fe Spreading Grounds (SFSG). The influence of recharge from the SFSG has a dramatic effect on gradients and flow directions in Subarea 1 and Subarea 2 far greater than effects from the ISG. Failure to incorporate this controlling and prominent hydraulic feature of Subarea 1 in EPA's evaluations will continue to handicap EPA's ability to conduct valid modeling for the OU."

EPA Response: Contrary to what is stated in this comment, current recharge practices at SFSG are incorporated into all of EPA's simulations. Recharge at SFSG is incorporated in the model in the northern portion of RI Area 3 (see Figure 7-4 and Section 7.2.1 in the FS). Of the four quarters included on Figure 7-4, only the Spring 1983 quarter had substantial recharge volumes at SFSG. As shown in the figure, the high recharge rates at SFSG cause significant changes in the magnitude and direction of groundwater flow throughout the OU area (compared to the "average" groundwater flow conditions shown for the Fall 1986 and Spring 1987 quarters). Also, as shown in Figure 7-4, although there is a large "mound" created by recharge at ISG (recharge at ISG is entered as a nodal value, while recharge at SFSG is a elemental value spread over four nodes), the groundwater flow changes attributable to ISG impact a much smaller area than the more regional impacts caused by SFSG.

Aj#144. "The "Base Case" simulations also fail to include the capture influence from existing production wells operating within the OU. Several production wells operate within the OU that have a "positive" effect on limiting contaminant migration. This component will need to be evaluated in order to conduct a proper analysis of the "No Action" Alternative. Please incorporate this component into the "Base Case" simulations and make these results available to the public for review. Those wells that have a "positive" effect on limiting contaminant migration should be summarized similar to the way that EPA has summarized those wells with a "negative" effect as identified in Table 7-3 and Figure 7-2."

<u>EPA Response</u>: The "Base Case" simulations <u>do</u> include the influence of existing production wells operating within the OU area. For example, as is recognized in the next comment and in subsequent comments, the Lante/Arrow Highway production well cluster in the middle of Subarea 2 does cause deflections in the groundwater contours shown in two of the four water level maps included in Figure 7-4.

In reviewing Figures 7-4 through 7-8 to respond to this comment, we noticed that the effects of the Lante/Arrow Highway well cluster are obvious in the Spring 1983 and Fall 1989 maps, but difficult to detect in the Fall 1986 and Spring 1987 maps. We therefore reviewed the model input files to confirm that operation of this well cluster was simulated throughout the 12 and 3/4 year modeling period as intended. We discovered that in the 51 quarters simulated, significant pumping at Lante/Arrow (at 3,000 gpm) was simulated in 47 of the 51 quarters. Of the four quarters in which pumping was inadvertently not simulated, two are the Fall 1986 and Spring 1987 quarters presented in Figures 7-4 to 7-8. This error has negligible impact on the modeling results (i.e., EPA's recommended extraction rates and locations) since the zone of drawdown resulting from extraction at this cluster does not extend into either Subarea 1 or 3, and no impact on any aspects of the remedy, but we apologize for the error.

We also note that this error would not affect the particle tracking results presented in Figure 7-9 or 12-2 since the error is less than 8%. (Extraction at this cluster was assumed in 47 of 51, or more than 92%, of the quarters.)

Aj#145. "The production well in the center of Subarea 2 in the Fall 1989 simulation appears to provide containment of a large percentage of the contamination area. What is the pumping rate of this well? What level of containment to Subarea 1 is already being provided by this well?"

EPA Response: The simulated pumping rate for this well (the Arrow/Lante well cluster) is 3,000 gpm. The "level of containment" can be interpreted from Figures 7-4 and 12-2. In Figure 12-2, it is apparent that the cluster can extract and contain some of the contaminated groundwater originating in Subarea 1.

Two limitations of relying on extraction at this cluster are:

(i) The cluster can extract and contain some, but not all, of the contaminated groundwater originating in Subarea 1. The capability of the cluster to contain known areas of contamination is greatest during dry periods with little recharge and a flat gradient (e.g., Fall 1989), and most limited during periods of high rainfall or significant artificial recharge.

(ii) The Arrow/Lante cluster is located further away from the known source areas than EPA's recommended extraction locations, allowing further degradation of the interval between EPA's recommended locations and the Arrow/Lante cluster. Contaminant concentrations are significantly higher upgradient of EPA's recommended extraction locations than immediately upgradient of the Arrow/Lante cluster.

See Response B for additional discussion of the advantages and limitations of alternative extraction configurations in Subarea 1.

Aj#146. "As shown in the simulation, recharge at ISG has a significant impact on the groundwater flow regime. The mound, which is located on the eastern edge of Subarea 2, is especially prevalent during the Spring 1987 simulation. If extraction in Subarea 1 (13,000 AF/YR) is recharged at ISG, increased mounding would be expected with potential large impacts on groundwater flow. How would this affect contaminant transport and concentrations in Subareas 2 and 3?"

EPA Response: As described in Section 7.2.1 of the text, additional spreading at ISG would likely increase the groundwater gradient and change groundwater flow directions slightly in lower Subarea 2 and upper Subarea 3. However, as shown in Figure 7-4, the mound created by ISG does not significantly impact the orientation of groundwater contours within the subareas. Thus, the overall impact of increased spreading at ISG on contaminant migration may not be substantial. Due to uncertainty about the precise distribution of historical or existing contaminant concentrations in groundwater, it is not possible to predict the effect of additional recharge at the ISG on the precise distribution of contaminants.

Aj#147. "Extraction well locations on Figure 7-5 do not agree with extraction well locations shown on Figure 7-2. This disparity is most evident in Subarea 1. The progression of modifying extraction locations and rates is not sufficiently described or documented from a technical perspective."

EPA Response: We cannot identify any disparity. As far as we can tell, the two figures do agree.

We believe that we have adequately described and documented our efforts to determine extraction rates and locations. We cannot respond to this comment in more detail, since commentor expresses general dissatisfaction with the text without offering any specific criticisms.

Aj#148. "As mentioned in the text, the extraction rate of 38,500 gpm is much larger than necessary. In addition, it appears the three wells on the southern edge of Subarea 3 are pumping at inefficiently high rates and are pulling in a lot of uncontaminated water. Three wells may not be necessary to accomplish the objectives."

EPA Response: As described in the FS, we agree that an extraction rate of 38,500 gpm is larger than necessary to satisfy our remedial objectives.

Aj#149. "What is the northernmost extraction well in Subarea 3? What is the pumping rate? It does not appear to be contributing to the effectiveness of the system."

EPA Response: In Figure 7-5, the northernmost extraction cluster in Subarea 3 is Cluster 3, pumping at a rate of 2,000 gpm. As described in the FS, this well cluster was evaluated and eliminated during the development of the most efficient extraction configuration. It is not included in EPA's recommended extraction configuration.

Aj#150. "The extraction well clusters need labels on Figure 7-5 to allow the reader to determine the corresponding pumping rate at each cluster from Table 7-2."

EPA Response: Locations of extraction well clusters are shown in Figure 7-2.

Aj#151. "The production well in the center of Subarea 2 is pumping at a sufficient rate to capture the width of the upgradient portion of the plume in the Fall 1989 simulation. This simulation indicates that extraction Clusters 10 and 13 are redundant and unnecessary to provide containment."

EPA Response: We disagree with the comment that clusters 10 and 13 are redundant. See response to comment Aj#145 and Response B. We also note that potential remedies should not be evaluated solely in relation to conditions in the Fall 1989 quarter shown in Figure 7-6, which was an unrepresentative, extremely dry period in the middle of a prolonged drought. More typically, average rainfall, recharge, and groundwater flow gradients are higher. EPA's evaluations of potential extraction configurations described in Section 7 look at effectiveness during dry, average, and wet conditions (see p. 7-11).

Aj#152. "Why is extraction Well 13 not pumped in this simulation?"

<u>EPA Response</u>: The simulations were performed sequentially and Cluster 13 was not added to the extraction scenario until it became apparent that Cluster 10 alone could not effectively contain the entire width of Subarea 1.

Aj#153. Extraction Well 5 in the southwest portion of Subarea 3 appears to be pumping a lot of water outside of the contamination area. This is especially true during the two spring simulations. This water will dilute the contaminated groundwater. Was this considered in the influent chemistry estimates? Is this an efficient use of resources?

<u>EPA Response</u>: As shown in Table 7-4 of the FS, the influent estimate for Cluster 5 was assumed as a 50/50 mix of the chemistry found in Clusters 3 and 6. Water quality data are not currently available in the immediate vicinity of Cluster 5.

As described in the text and figures in Section 7 of the FS, groundwater flow conditions (direction and rate) in the OU area vary considerably over time. The zone of influence of the simulated extraction well locations and rates will extend further beyond the subarea boundaries under certain flow conditions. Thus, the preliminary extraction rates identified for the various clusters may not be the "optimum" rates for all times of year (i.e., for all groundwater flow scenarios).

Aj#154. "It appears that the eastern extraction well in Subarea 2 will be pumping clean water moving downgradient from the ISG."

<u>EPA Response</u>: Because the ISG are located very near the eastern boundary of Subarea 2, under some flow conditions, a portion of the capture zone from the referenced well will extend into the mound created by spreading at ISG.

Aj#155. "Again, a production well in the center of Subarea 2 appears to be pumping at a rate sufficient to achieve the containment objective in the Fall 1989 simulation. What pumping rate is used for this well in the simulations? Is it less than extraction rates proposed for Clusters 10 and 13? If they are less, could these proposed extraction rates be reduced during dry years and still achieve containment?"

<u>EPA Response</u>: See responses to comments Aj#145 and Aj#151 for the initial two questions in this comment.

The extraction rates proposed in the FS are "average" rates that satisfy the remedial objectives under most flow scenarios. However, as stated above, they are not the optimum rates during all flow scenarios. Lower extraction rates would likely still meet the remedial objectives during extended dry periods. Conversely, higher rates could potentially be needed if significant increases in recharge of imported water or extended wet periods occur.

Aj#156. "It is unclear why Figure 7-8 presents the optimum well arrangement and rate for the OU. No selection criteria were established prior to discussion of simulation results, no capture zones are shown on the figure, the Subarea boundaries are not concentration related, and how each simulation arrangements achieves selection criteria is not discussed. To independently validate the selection of well locations and pumping rates, a significantly more detailed discussion on the modeling and selection procedure is needed."

EPA Response: At least one of the assertions in this comment duplicates (and is rebutted) in previous comments. See response to comment Aj#132 which describes the use of water quality data in delineating Subarea boundaries.

See p. 7-11 for a description of the selection criteria for the optimum flow rate and pp. 7-11 and 7-12 for a brief discussion of the extent to which the extraction configuration assumed in each simulation meets the criteria. Page 7-11 describes the optimum rate as "that rate at which the zone of influence from the extraction wells extends to just beyond the subarea boundary during a majority of the model period."

Capture zones were not drawn on the referenced figure (or the rest of these groundwater contour figures) so that the reader can have an unobscured picture of the simulated groundwater contours resulting from the extraction scenario. As stated on page 7-12 of the FS, the zone of influence for each extraction well can be added to the figure for each quarter "by drawing lines perpendicular to the contours and noting whether they terminate at one of the potential extraction locations." However, revised figures are attached (Figure RS-4 to 8) that include approximate capture zones.

Aj#157. "Contrary to the strategy of reducing pumping rates to not influence capture outside Subarea boundaries, Figure 7-9 clearly shows that capture zones include areas outside the Subarea boundaries."

EPA Response: To account for the uncertainties inherent in the simulations and to provide a "margin of safety", the objective was for the capture zones to extend "just beyond" the subarea boundaries. Thus, the capture zones are intended to include some areas outside of the subarea boundaries.

Aj#158. "Because of the shifting groundwater gradients, the eastern wells are less effective during dry periods and the western wells are less effective during wet periods. In addition, during dry periods significantly lower pumping rates are necessary to achieve the objectives. Could pumping rates be alternately reduced on either side to optimize the system? This would reduce the amount of clean water that would be pumped and treated."

EPA Response: Yes, pumping rates could vary over time. Constant, continuous extraction was assumed in the FS to simplify the development, costing, and evaluation of remedial alternatives. Specific operating scenarios will be determined during remedial design, and the "optimization" discussed in the comments could be evaluated at that time. It should be noted that periodically shifting the extraction between different wells would significantly complicate distribution of the treated water and would likely result in higher capital costs because the facilities on either side would need to be upsized to be able to handle a larger fraction of the total extraction rate required.

Aj#159. "The production well not identified in Subarea 2 is capable of containing the plume. Therefore, well clusters to the north in Subarea 1 and to the south in Subarea 2 are redundant."

EPA Response: This comment duplicates previous comments. See responses to comments #Aj145 and Aj#151.

Aj#160. "Why were additional simulations not conducted that evaluate lower quantities of pumping? Given the shifting groundwater flow directions and the problems of water disposal, it is important to establish the lowest pumping quantities possible that achieve EPA objectives. Why were no simulations conducted that examine varying pumping rates for varying groundwater flow directions?"

EPA Response: Multiple simulations were conducted to evaluate the performance of a variety of pumping rates for varying groundwater flow directions. The results are presented in Figures 7-5 through 7-8 and summarized in Table 7-2. We believe that the recommended rates do represent the minimum acceptable extraction rates given currently available data.

Also see response to Aj#158 on the feasibility of varying extraction rates over time.

Aj#161. "Many of these adverse effects such as pulling NO_3 toward extraction wells could be avoided if pumping rates were balanced. When water is pumped from the east where NO_3 concentrations are high, the well is also pumping smaller concentrations of VOCs. Therefore, the pumping rate of this well could be drastically reduced while other wells in more optimal locations are still pumping."

EPA Response: We assume that the first sentence of this comment is again referring to an operating scenario where extraction is moved between eastern and western clusters depending on whether a wet or a dry cycle is occurring. It is not correct to state that "pulling nitrate toward extraction wells could be avoided if pumping rates were balanced." Because nitrate contamination is already present within the subareas, any extraction scheme intended to contain migration out of the subareas will increase migration of nitrate toward the extraction wells. However, we agree that minimizing capture of water from beyond the eastern boundary of the subareas will help restrict the increase in nitrate migration.

The second and third sentences of this comment appear to be referring to a specific well cluster but do not identify the cluster. Regardless of the cluster number, we do not think that there are any clusters where the pumping rate could be "drastically reduced." Also see responses to previous comments on extraction rates and locations.

Aj#162. "Although it is true that the ISG are presently located on the eastern edge of the contaminated area, they were located well within the contamination area in the early 1980s. Will increased recharge at SFSG during wet years "push" the plume back to the southwest again? If so, recharge at the ISG could spread contamination into currently clean areas to the south and southeast."

<u>EPA Response</u>: See response #Aj146 for a brief discussion of the effects of recharge at the ISG.

Aj#163. "The footnote at the bottom of the table indicates that VCWD intends to increase production at the Arrow well. This well is centrally located in Subarea 2 and is capable of providing a significant degree of migration control. This makes extraction Clusters 10 and 13 redundant. Why not cancel one of the two extraction locations and move the other up to the source area north of I-210 to optimize mass removal and migration control?"

<u>EPA Response</u>: This comment duplicates previous comments. See responses to comments Aj#145 and Aj#151.

Also, see Response B for a more detailed discussion of the rationale for the proposed Subarea 1 extraction scenario.

Aj#164. "The selection of "potentially controlling VOC contaminants" should have been accompanied by an evaluation and tabulation of the frequency of occurrence, mean or median concentration and concentration range. Estimated concentrations at the extraction wellhead can then be determined."

<u>EPA Response</u>: EPA identified a list of *potentially controlling compounds* to assist in the prediction of future contaminant concentrations. For compounds that are not *potentially controlling*, EPA simply assumed that the maximum historical concentrations of each compound detected at each well could occur in the future. For compounds that are *potentially controlling*, EPA devoted more effort toward evaluating past variability in concentration and predicting future concentrations.

The need for summary statistics or the relevance of the summary statistics mentioned in the comment to this effort is unclear. However, the information requested in the comment is tabulated for the influent estimates described in Appendix B, including frequency of occurrence, mean concentration, maximum concentration, and the date of the most recent data available.

Aj#165. "How can vinyl chloride be selected as a "controlling" compound when concentrations at all clusters except 10 and 13 were estimated at 0.0 ug/l? It is inconceivable that 11 parameters (chemicals) will directly control design of the treatment system."

EPA Response: We agree that labeling the eleven compounds in Table 7-4 as "controlling" is confusing; the compounds are better labeled (and described in the text) as "potentially controlling" compounds." Regardless of how they are labeled, the eleven are "compounds that may control cost or limit use of a treatment methods" (as explained in the footnote to the Table). These are compounds whose presence may impact the design or operation of the treatment facility if their concentration in the influent to a treatment facility increases by a factor of ten or more above the estimated concentration listed in the Table.

EPA could have used a simpler method and identified only one controlling compound based on the estimated influent concentrations. This method would have been less informative, however, since historical variation in concentrations leads us to expect future influent concentrations to vary from the estimates. Because future variations cannot be predicted with 100% certainty, we list all of those compounds that may become controlling compounds if their concentrations rise sufficiently.

Aj#166. "The discussion of peak concentrations discounts the possibility that higher upgradient concentrations in Subarea 1 will migrate downgradient to the proposed extraction wells because of the absence of long-term increasing VOC trends. In fact, overall long-term increasing trends are generally absent throughout the entire OU."

EPA Response: We agree that increasing trends are not evident for all contaminants at all wells, and do not expect to see such trends at all wells. As discussed in Response A, however, increasing trends have been documented at a number of locations.

Aj#167. "Groundwater with VOC concentrations orders of magnitude higher than the proposed influent chemistry at the proposed extraction locations exists a little over 1-mile upgradient. Controlling these high concentrations should be the highest priority when considering a remedial action."

EPA Response: This comment duplicates previous comments. See Response B.

Aj#168. "The second paragraph and the footnote for Table 8-1 are confusing. Why are there two different allocations of flow contribution percentages? Please clarify this discrepancy."

<u>EPA Response</u>: As explained in the footnote to Table 8-1,

> "Estimated concentrations and required reductions listed in this Table [8-1] are based on a preliminary estimate of the blended contaminant concentrations expected in the influent to a treatment facility. The estimates were subsequently revised. The revised estimates are listed in Table 7-5 and used in the description and evaluation of remedial alternatives in Sections 11 and 12."

EPA chose not to repeat the evaluation presented in Section 8 using the revised concentrations because the cost of repeating the analysis would have been greater than any benefits of doing so. Revising the analysis would not change the ranking of the remedial alternatives or significantly affect the estimated cost of the alternatives.

Aj#169. "The document should provide a rationale for sizing treatment plants at 35,000 gpm, which is 21 percent over the required 29,000 gpm. The 29,000 gpm already includes a backup tower with approximately 2,900 gpm capacity, or approximately 10 percent over-capacity capability."

<u>EPA Response</u>: The remedial alternatives are <u>not</u> sized at 35,000 gpm. Remedial alternatives 2, 3, and 4 are assumed to have a capacity of 29,000 gpm, not 35,000 gpm.

The 35,000 gpm rate is assumed in the evaluation of treatment technologies included in section 8, but this evaluation was <u>not</u> used to define the size of or estimate the cost of the remedial alternatives. There was no need to repeat the treatment technology evaluation with a different rate since the conclusion was not expected to change. As stated on page 8-11:

> "The relative ranking of treatment technology costs of the candidate treatment technologies is believed to be independent of flow rate within the range of 5,000 to 70,000 gpm."

Aj#170. "Case 3 (LGAC only) is stated to be less attractive for several reasons including the fact that this technology would not be able to reduce estimated peak vinyl chloride concentrations. Vinyl chloride has not been detected except in a few isolated wells and has not been consistently detected. Therefore, this concern is unfounded."

<u>EPA Response</u>: We disagree that our concern about the presence of vinyl chloride is "unfounded." Vinyl chloride was detected in 14 of 40 samples collected from a monitoring well in the "upper area" between 1984 and 1993, at an average concentration of 1.2

ug/l (well #W11AZW01). The California Maximum Contaminant Level for vinyl chloride is 0.5 ug/l. Peak concentration in the same period was 10 ug/l. The potential presence of vinyl chloride in EPA's proposed treatment facilities is an important consideration in the selection of a treatment technology.

Aj#171. "Estimating the cost of the four treatment options using "peak" VOC concentrations and a required treatment capacity of 35,000 gpm is overly conservative and yields unrealistically high capital costs. It is unclear why capital costs were estimated using "peak" concentrations, while operation and maintenance (O&M) costs were estimated using "average" concentrations."

EPA Response: As explained in the response to comment Aj#169, the estimated capital costs of Remedial Alternatives 2,3, and 4 are based on as assumed capacity of 29,000 gpm, not 35,000 gpm.

The simplest method of estimating project costs would have been to predict a single influent concentration. To increase the accuracy of the cost estimates, however, EPA predicted both peak and average concentrations to estimate capital and operating costs, respectively. Estimating peak and average concentration increases accuracy because a treatment facility must be designed to handle the highest concentration expected (i.e., peak concentrations), but the cost of operation will reflect actual day to day contaminant loadings (best estimated with average concentrations). As described on page 8-7:

> "The estimated peak contaminant concentrations listed in Table 8-1 are used to estimate and compare the size, configuration, and capital cost of four VOC treatment options. The estimated average contaminant concentrations are used to estimate contaminant loadings, carbon and oxidant usage, and other operating costs."

Aj#172. "How is a 15-year equipment life resolved with a 30-year project life? This discrepancy would suggest that O&M include at least one set of equipment replacement costs for blowers, pumps, and air stripper lower packing."

EPA Response: The costs for a one-time equipment replacement (after 15 years of operation) are included in the O&M cost estimates prepared for the comparison of alternate treatment process options. However, these equipment replacement costs were inadvertently omitted from the remedial alternative cost estimates included in Section 12. The impact of treatment equipment replacement costs on the total cost of the alternatives is not large. For Alternative 1, the estimated equipment replacement cost is approximately $1,100,000. Using an interest rate of 5 percent and assuming that the replacement equipment would be purchased in 15 years, the present worth value of this cost is about $540,000 (less than 1 percent of the estimated present worth of the alternative). For Alternatives 2 through 4, the estimated replacement cost would be about $1,750,000. The present worth of this cost is approximately $840,000 (also less than 1 percent of the total present worth of these alternatives).

Aj#173. "The fact that "influent concentration" has the largest effect on costs contradicts statements made in earlier chapters that accurate determination/estimation of influent concentrations is not necessary, and non-CLP data that has undergone limited QA is sufficient."

EPA Response: We see no contradiction. Commentor misstates EPA's position, then applies flawed logic to reach an incorrect conclusion. First, EPA does not state that influent concentration has the largest effect on costs. EPA merely lists "influent concentrations" as one of several assumptions that affects the estimated treatment cost (page 8-23). Second, the ranking of this assumption in relation to other assumptions does not imply the need for any particular level of precision or accuracy. Nor does EPA state that accurate determination/estimation of influent concentrations is unnecessary. On pages 3-1 to 3-5 and in the response to comments Aj#32-34, we describe the quality of non-CLP data and the level of accuracy appropriate to the estimation of influent concentrations. We conclude that non-CLP data are adequate for use in estimating influent concentrations.

Aj#174. "It should be noted again that influent concentrations may change significantly if pumping locations are changed. This is especially true for the controlling compounds such as 1,2 DCA and 1,1 DCE."

EPA Response: We agree.

Aj#175. "This table [8-9] presents four compounds that will control design of the three considered treatment options. This conclusion conflicts with the ten compounds presented as controlling VOCs in Table 8-1. Please resolve this discrepancy."

EPA Response: Table 8-9 lists eight compounds (four "controlling" and four "potentially controlling"). Table 8-1 presents a list of ten "controlling" compounds, which includes the same eight compounds identified in Table 8-9 and two additional compounds identified later in the development of remedial alternatives. Compounds in both tables are potentially controlling - i.e., if their concentrations rise by factors of five or so above historical peak concentrations they could control the design, limit the operation, or significantly affect the operational cost of the treatment facilities.

Aj#176. "There are several treatment plants currently in operation in the basin; two are located in this OU. Why are these operations not discussed and evaluated in Section 8? Did EPA compare cost estimates to actual costs, and identify specific designs or O&M problems more accurately through an evaluation of this data? If not, why not?"

EPA Response: This comment duplicates a previous comment. See response to Aj#121.

Aj#177. "According to Table 4-3 (p. 4-14) the EPA lifetime adult health advisory concentration for radon is 1.5 picoCuries per liter (pCi/l). However, it is stated in Section 8 that "radon is a naturally occurring radioactive gas present in most groundwater and has been measured in groundwater samples collected in the OU at concentrations between 213 and 430 pCi/l, and in other portions of the San Gabriel Basin at concentrations in the 500 to 1,000 pCi/l range". The statement in the *OUFS* that "radon is of concern since concentrations in portions of the OU area exceed the proposed Rn MCL and because of potential treatment facility operator exposure" (p 8-10) implies that residents and municipal workers have always been exposed to unacceptable levels of radon. The implications of Rn on the configuration and operation of the OU should significantly affect cost allocation for treatment costs. How will these costs be allocated?"

EPA Response: EPA's statement that "radon is of concern" does not necessarily imply past or current exposure to unacceptable levels. The full statement is:

> "Radon [Rn] is of concern since Rn concentrations in portions of the OU area exceed the proposed Rn MCL and because of potential treatment facility operator exposure. If, however, air stripping or LGAC are the selected treatment technology for VOC removal, additional treatment for Rn will probably not be required since both of these technologies remove Rn. The implications of Rn on the configuration and operation of the OU are discussed in Section 8.4.3."

EPA's preliminary evaluation (described on pages 8-33 to 8-41) indicates that the presence of radon will not significantly affect the cost of the remedy. The most likely costs, if any, would be associated with efforts to limit operator radiation exposure. EPA would most likely view any costs associated with limiting operator exposure to radon or its decay products as part of the cost of cleanup.

Aj#178. "Aquifer recharge should be considered as an independent general response action, not solely as a means for disposal of treated water."

We agree that any remedial effects of aquifer recharge should be considered in selecting the method or methods of disposing of treated water. EPA's evaluations described in the FS indicates that the differences in remedial effectiveness are likely to be less significant than differences in cost. See response to comment Aj#179.

Aj#179. "It is stated that "recharge at existing facilities can provide some remedial benefit", however, this component is not included into any of the remedial alternative options."

EPA Response: EPA did consider the remedial effects of recharge in the development of the remedial alternatives.

As discussed in Section 9, there are potentially positive and negative remedial impacts associated with spreading at both ISG and SFSG. Impacts of recharge in the San Gabriel River are likely to be limited, because recharge in the River occurs over a 4-mile stretch, most of which is located more than one mile cross gradient and downgradient from the OU area of contamination (see Figure 9-1).

Recharge at the three locations (SFSG, ISG, the River channel) was assumed in computer simulations during the development of the remedial alternatives. The results of one of these simulations is shown in Figure 11-2 and described on p.11-6 for recharge primarily at ISG [86 percent], with the remainder recharged in the river channel [14 percent]. The results do not indicate that recharge of treated water produces significant remedial benefits in relation to the remedial benefits of properly located groundwater extraction wells. EPA therefore chose not to prescribe recharge as the preferred treated water distribution option in any of the remedial alternatives.

Aj#180. "Infiltration of water in the San Gabriel River could be used as a beneficial component to reduce contaminant migration in the OU. This component should be incorporated into at least one set of the modeling simulations used to evaluate remedial alternatives."

EPA Response: See response to previous comment, Aj#179.

Aj#181. "As previously stated, EPA's modeling simulations fail to identify the detailed effects of recharge from the SFSG on the localized groundwater flow regime. Independent modeling simulations and actual water level measurements conducted by HLA indicate that recharge at the SFSG changes the groundwater flow direction from southwesterly to easterly, not "more southerly toward the recommended OU extraction locations" as stated by EPA. This makes it more difficult for the proposed extraction wells to capture contaminants from the upgradient portion of the OU. Failure to recognize the changes in flow directions and gradients may result in negative impacts to the OU rather than beneficial results. These components of EPA's remedial alternative selection process warrant further consideration and technical improvement."

EPA Response: The first sentence in this comment is incorrect. See response to Aj#143.

In response to the second sentence, we agree that recharge at the SFSG changes the flow directions to a more southeasterly direction, rather than to a more southerly direction. This effect is shown in Figure 7-4. As stated several times in the text, including in the paragraph referenced in the comment (p.9-10, 3rd paragraph), EPA acknowledges that recharge at SFSG has potentially negative remedial impacts and could increase the amount of extraction necessary to attain remedial objectives.

Aj#182. "Although the discussion focuses on the potential capacity of the SFSG, the ability of the aquifer to receive this additional water is not evaluated. Rising water levels have a variety of negative impacts, including flooding of gravel operations. Average yearly spreading quantities of 40,000 AF/YR will be increased 50 percent with the possible 20,000 AF/YR added by USGVMWD. An additional 14,000 AF/YR from Subarea 1 extraction (Alternative 1, 8500 gpm) could create significant impacts on groundwater levels. The impacts are compounded during wet years when precipitation and runoff are higher."

<u>EPA Response</u>: EPA has completed an evaluation of the impact of additional recharge on water levels and on the movement of groundwater in the vicinity of the spreading basin. See pages 11-6 to 11-9, which presents the results of a computer simulation in which 24,000 af/yr was assumed to be recharged at the SFSG.

EPA's preference is for treated water to be distributed to water purveyors for direct use, but even if a majority of the treated water is recharged, the amount recharged will be small in relation to volumes already recharged. EPA does <u>not</u> expect its remedy to result in water levels exceeding the *operating limits* allowed by the Alhambra Judgment. EPA expects that any additional impacts on water levels resulting from the actions of the Metropolitan Water District will be mitigated through agreements between Metropolitan and the Watermaster or individual water purveyors. In any case, Section 9 includes a discussion of potential adverse effects of lower or higher water levels, including flooding of gravel quarries (pages 9-26 to 9-27). Commentor is apparently dissatisfied with EPA's evaluation, but does not specify what additional evaluations should be completed.

Commentor mistakenly asserts that average yearly spreading by USGVMWD will increase 50 percent. Representatives of the USGVMWD have stated that they do not plan to increase their net usage of the SFSG. Their plans are to supply reclaimed water for direct use or to recharge reclaimed water in place of imported water, resulting in no net change in the amount recharged. See 11/5/93 letter from Timothy Jochem of the USGVMWD, included in the Administrative Record.

Aj#183. "Recharge effects of this alternative [export by Metropolitan] must also be evaluated. Recharge at SFSG would be significantly increased if MET recharged a similar amount in the winter months that they bought in summer months. EPA would still have to find a discharge point for water pumped in winter months. If MET and purveyor demands were low and MET used additional capacity at SFSG, where could the winter extraction volumes be discharged?"

As described in the response to the previous comment, EPA has completed an evaluation of the impact of additional recharge at the SFSG on the movement of groundwater in the vicinity of the spreading basin. Additional evaluations may be completed if recharge is determined to be a preferred method of distribution, and as recharge scenarios are better defined.

"Winter extraction volumes" may be delivered to one or a combination of the three distribution options described in the Feasibility Study: delivery to water purveyors for local use; delivery to Metropolitan Water District for export; and recharge. EPA's evaluations indicate that it should be feasible to distribute the proposed 19,000 gpm to one of a combination of options. The comment highlights the fact that distribution of treated water may be more difficult in winter months than in summer months, due to decreased consumer demand for water and increased competition for use of existing recharge areas.

Aj#184. "Declining water table conditions can result in decreased purveyor yields and the dewatering of monitoring and production wells."

We agree. This comment restates text on page 9-27:

> "Potential adverse effects of lower water levels include...decreased yield of existing wells (possibly to zero)..."

Aj#185. "Extraction locations should be selected based on technical reasons rather than site availability. The highest contaminant concentrations are over a mile to the north. Was a parcel review conducted there?"

Extraction locations <u>are</u> based on technical reasons. Pages 10-12 to 10-14 include a discussion of site availability and other factors to be considered in selecting parcels for new extraction wells, but clearly state that "proximity to the preferred extraction locations [is] the primary consideration in siting the wells." The next paragraph on page 10-12 notes that the rationale for selecting preferred [extraction] locations is explained in section 7.

The Feasibility Study offers criteria to help guide the selection of specific parcels, but does not include an evaluation of the tens or hundreds of potential extraction well sites.

Aj#186. "The OUFS contains significant technical uncertainties in addition to the institutional and logistical uncertainties summarized in this discussion. There is only one monitoring well outside of Subarea 1. No data exists on the vertical distribution of contamination in Subarea 1. Upgradient limits and downgradient limits of the contamination are poorly characterized. These technical uncertainties could have a large impact on costs and may complicate the design of an effective remedial action."

<u>EPA Response</u>: This comment duplicates previous comments. See Response F for a detailed response. We do not believe that uncertainty in the extent of contamination will interfere with

remedy selection, have a "large impact on costs," or unreasonably "complicate the design of an effective remedial action.

Aj#187. "On the basis of the significant data gaps regarding the distribution of chemicals in groundwater and hydrogeologic conditions in the OU, and EPA's inability to correctly identify "baseline" conditions in modeling simulations (e.g., historical and current production well influences, recharge effects from the SFSG), there exist significant obstacles that need to be resolved prior to the development of effective remedial action alternatives. Failure to properly characterize these controlling elements prior to remedial alternative development (Section 11 of the OUFS) may result in adverse impacts to the OU and further complicate long-term remedial actions."

EPA Response: The statement regarding "EPA's inability to correctly identify "baseline" conditions in modeling simulations" is incorrect. EPA's model is able to simulate past and present production well influences, as well as the effects of recharge at SFSG (see response to comment Aj#143). We also disagree that *current data gaps* present obstacles that need to be resolved before remedy selection or "may result in adverse impacts to the OU and further complicate long-term remedial actions." See Response F for a more detailed response.

Aj#188. "This chapter does not adequately develop a "range" of remedial alternatives for the OU. Four "remedial alternatives" are presented, however, with few minor exceptions these alternatives are "mirror images" of each other. This does not allow EPA or the reviewer to select from a true range of alternatives. Differences between alternatives are primarily in the option selected for use of the treated water (e.g., recharge, export, and local use). Three alternatives contain identical extraction schemes (29,000 gpm) with the fourth alternative lacking only extraction in Subarea 2 (19,000 gpm total)."

EPA Response: We believe that the four remedial alternatives represent an appropriate range of cleanup options. The comment expresses dissatisfaction with the range of alternatives included in the Feasibility Study, but does not identify any flaws in logic or in the specific analyses completed during development and screening of the alternatives. Nor does the comment specify other alternatives that should be considered.

We also disagree with the comment that the choice of alternatives limits a reviewer's ability to offer comments on EPA's proposal. In the Baldwin Park Proposed Plan, EPA welcomed comments on all aspects of the Feasibility Study, including the screening process completed to develop remedial alternatives. The range and volume of comments provided by Aerojet/ALR indicates recognition of the opportunity to comment on all aspects of EPA's proposal.

We wish to emphasize that the purpose of much of the Feasibility Study is to explain the methodology used to screen out the less-promising alternatives, and to describe the results of each screening step (e.g., sections 6, 7, 8, 9, and 11). Section 6 explains the rationale behind, and defines, EPA's remedial objectives. Section 7 describes the extent of contamination and the results of computer modeling completed to determine approximate extraction rates and locations. Section 8 describes cost estimates completed to identify and estimate the costs of treatment technologies. Sections 9 and 11 include evaluations of existing water purveyor systems, evaluations and projections of spreading basin capacity, and comparisons of pipeline alignments to identify promising distribution options.

Aj#189. "The 12 "water use options" all focus on disposal of the treated water rather than as a component to enhance remedial effectiveness. Why is this important and beneficial aspect for alternative development excluded from the *OUFS*?"

EPA Response: We assume that the comment is referring to using recharge to enhance remedial effectiveness as previous comments have. As described in the response to comment Aj#179 and in the subsequent comment (which reprints text from page 11-6), recharge at the three available facilities does not significantly enhance remedial effectiveness as is implied by the comment.

Aj#190. "The statement that "the analyses of the 12 water use options focus on cost, rather than on the other Superfund evaluation criteria (such as remedial effectiveness), because computer simulations do not indicate that the choice of water use option results in a significant difference in remedial effectiveness" demonstrates EPA's limited evaluation of remedial alternatives considered for the BP *OUFS*."

EPA Response: We disagree, and commentor merely asserts that EPA's conclusions are inadequate without offering evidence to the contrary. As described in response to Aj#179, EPA's evaluations did not indicate that recharge would significantly enhance remedial effectiveness at any of the three facilities, and, at ISG and SFSG, the potential negative remedial impacts may actually outweigh any benefits of recharge.

Aj#191. "Recharge of treated groundwater should have been considered as a general response action that would enhance the remedy or combined into a broader response action (e.g., hydraulic containment). For example, recharge of treated water along segments of the San Gabriel River can be used to enhance the remedial effectiveness of the response action in the OU. On the basis of the very sketchy information regarding the use of aquifer recharge as an independent general response action in the *OUFS*, it is apparent that EPA has not conducted a complete technical evaluation of remedial alternative options, but focused on one remedial alternative with a range of extraction rates and two water disposal options."

EPA Response: We disagree with the conclusions included in this comment, which duplicates previous comments. See responses to comments Aj#94, Aj#179, and Aj#190.

Aj#192. "The use of the CFEST model for the purpose of evaluating OU decisions (as implied in the statement "Section 7 provides recommendations on the rate

and locations of groundwater extraction based on the results of computer modeling simulating the effects of various extraction configurations on the movement of groundwater and contamination in the OU area" [p. 11-1]) is considered technically inappropriate. The CFEST model is not sufficiently calibrated on a localized scale to provide the degree of detail necessary for evaluating OU alternatives. As previously stated in comments submitted to the EPA dated January 20, 1993, failure to recognize such deficiencies of the CFEST model will result in technically limited simulation results if applied to localized OU scale decisions."

EPA Response: We disagree with the conclusions included in this comment, which duplicates previous comments. See response to comments Aj#143 and Response C.

Aj#193. "EPA's own conclusion of their CFEST model is summarized as "EPA's groundwater flow model is a regional model intended to simulate groundwater flow over relatively large areas, using regionally averaged conditions. EPA's groundwater flow model is not, however, designed to discern local-scale effects". Regardless of this statement, the CFEST model is used extensively by EPA as the primary basis for remediation alternative development and evaluation that require detailed, local-scale analysis (e.g., Section 7.0)."

EPA Response: This comment duplicates previous comments. See response to comment Aj#132 and Response C for a description of the use of the CFEST model in the Baldwin Park OU.

Aj#194. "Figure 11-2 also demonstrates that any pumping in Subarea 2 would pull clean water outside of the Subarea as a result, in part of groundwater mounding at ISG. This results in a decrease of remedial effectiveness and may have an impact on contaminant transport."

EPA Response: The first sentence is not correct in claiming that "any pumping in Subarea 2 would pull clean water outside of the subarea." Only extraction above a certain rate, during specific flow scenarios, captures water from outside of the subarea. As stated in response to comment Aj#156, the objective of OU extraction is to capture water from just beyond the subarea boundaries under most flow conditions. Because the ISG are located fairly close to the subarea boundary, part of the capture zone does intersect the mound created by spreading at ISG.

We agree that spreading at ISG does result in some negative remedial impacts downgradient of the facility, as described in Section 9 of the FS.

Aj#195. "Option 1A appears to be a more efficient option than the enormous amounts of pumping recommended in the proposed plan. It should be pursued if it is determined that pumping in Subarea 3 is necessary. If properly located, one well alone could provide a substantial amount of migration control."

EPA Response: Option 1A alone cannot meet the migration control objective for Subarea 3. Option 1A and other Subarea 3 options were evaluated individually to identify the most cost effective water distribution option for each individual well cluster, and are not intended as remedial alternatives.

We agree that one well alone can provide a substantial amount of migration control. As shown in the FS, relatively few wells or well clusters are needed to provide containment across large areas of contamination.

Aj#196. "The inclusion of Cluster 5 into the Subarea 3 response action is inappropriate. The only benefit from this location is to address a single and distinct localized source of carbon tetrachloride that is not connected with the regional distribution of TCE/PCE. Please explain the rationale for including Cluster 5 into the regional Subarea 3 response action?"

EPA Response: Carbon tetrachloride has been detected consistently over time at multiple locations, not at a "single and distinct location." Even if no other contaminants were present, the concentrations of carbon tetrachloride in groundwater would warrant remedial action.

We are unsure of the meaning or implication of the comment that the carbon tetrachloride is *not connected* with the regional PCE/TCE contamination. Commentor offers no evidence of the source of any of the contamination, whether PCE, TCE, CTC, or any of the other contaminants. It is interesting to contrast this assertion of a CTC "microplume" with previous comments that the available water quality data are insufficient to adequately characterize the extent of contamination.

Aj#197. "Putting the treated water into lined Big Dalton Wash and allowing infiltration along the unlined mile of Walnut Creek may provide containment for the localized microplume of carbon tetrachloride. Cluster 5 is unnecessary."

EPA Response: We disagree that cluster 5 is unnecessary. See response to comment Aj#179 regarding the remedial effects of recharge in this stretch of Walnut Creek.

Aj#198. "Has the impact of the additional 13,000 AF/YR recharge in SFSG been evaluated in terms of contaminant transport and concentrations? As described earlier, additional recharge at SFSG will have a significant impact on groundwater flow and contaminant transport."

EPA Response: As part of alternative development, recharge of various amounts of water at SFSG was simulated to evaluate the impacts on groundwater flow and contaminant transport. These simulations included a range of recharge volumes, most of which were larger than the 13,000 ac-ft/yr value discussed here. See response to comment Aj#179 for a description of a computer simulation which assumed recharge of approximately 25,000 gpm at the SFSG. The effects of recharge at the SFSG on the distribution of contaminant concentrations in the OU area were not evaluated.

Aj#199. "Since the other water options, such as artificial recharge or supplying water to purveyors in lieu of pumping, do not result in a net loss

of groundwater storage, MET should be required to replace water that is exported. However, this would significantly increase the amount of water that MET would need to recharge in the SFSG, causing locally rising groundwater levels and additional demand on SFSG capacity. This could also impact groundwater contaminant concentrations and transport."

EPA Response: Restrictions on, and impacts of, increased Metropolitan involvement in the San Gabriel Basin are being addressed in negotiations between Metropolitan and the Main San Gabriel Basin Watermaster. We suggest you contact these parties for additional information on the need for replacement of exported water or other water resource issues. These issues are also discussed in Section 9 of the FS.

Potential effects of increased recharge at the SFSG are also described in the FS.

Aj#200. "Distribution of treated water to Little Dalton Wash has the advantage of adding a degree of migration control in Subarea 3. This recharge would flow from lined channels of Little Dalton Wash and Big Dalton Wash to unlined Walnut Creek, located immediately downgradient of Subarea 3."

EPA Response: See response to Aj#27 regarding recharge in this stretch of Walnut Creek.

Aj#201. "It appears that capital costs are higher with local use than with recharge. However, O&M could be higher with recharge depending on cost offsets by purveyors."

EPA Response: We agree. A similar comment is included in the Proposed Plan:

> "Recharge would probably be less expensive initially, but more expensive over the life of the project due to higher pumping costs."

Aj#202. "The no-action alternative or "Base Case" conditions are not correctly identified for the OU. At a minimum, it is known and stated in other sections of the OUFS that existing production Wells 1900034 and 8000060 are located in the OU and already have wellhead treatment equipment in operation. Please explain why these important wells have been excluded from "Base Case" simulations and evaluations."

EPA Response: As stated in numerous previous responses, extraction at these wells is included in the base case simulations and evaluations. See responses to comments Aj#144 and Aj#151.

Aj#203. "Due to the significant data deficiencies that are present in the OU, the large number of monitoring wells that are planned for installation at the plume fringes to establish an "early warning system" would be better used as monitoring wells to support system design. Wells should be placed in both the center of the plume as well as some plume margin areas to quantify plume movement."

EPA Response: Proposed monitoring wells are placed in both the center of the areas of contamination, as well as along the margins of the contaminated areas. A revised table and figure are included (Table RS-3 and Figure RS-3) that further defines the purpose of each monitoring well cluster.

Aj#204. "Once again, data that are instrumental in characterizing contamination in the upgradient portion of the plume are omitted. These data refine the iso-concentration lines and are located in a portion of the plume that is ignored in the proposed monitoring program."

EPA Response: Once again, we respond to the same comment. See response to comment Aj#40. Revised iso-concentration lines in the upgradient portion of Subarea 1 would not impact the proposed monitoring program.

Aj#205. "Because the plume is inadequately characterized in Subarea 3, the proposed new wells should be used primarily for characterization and monitoring prior to the selection of a remedial action in Subarea 3."

EPA Response: We disagree with the assertion that additional characterization work is needed prior to remedy selection. See Response F.

Aj#206. "There are no available data to determine the vertical distribution of contaminants in Subarea 1."

EPA Response: This comment duplicates previous comments. See responses to comments Aj#57- Aj#60.

Aj#207. "These tables list treatment objectives that are in all cases the lowest MCL of those listed in Table 4-2 (i.e., the lower of the federal and state MCLs, including proposed MCLs). This list includes both "applicable" and TBC ARARs; those MCLs not currently promulgated should not be used as treatment objectives, unless no other applicable or relevant and appropriate concentration limits are available. The text should clearly discuss which of these objectives are based on applicable and which are based on TBC ARARs."

EPA Response: As stated on page 8-10 and in response to comment Aj#72, the basis for the treatment objective for radon is the proposed MCL. Because the proposed radon MCL is not a final MCL, it is referred to as a "To Be Considered (TBC)." All other treatment objectives listed in Tables 11-5 and 11-6 are ARARs (with the exception of acetone, as noted in the Tables).

Aj#208. "Simulations in Section 7 demonstrate that higher extraction rates are not remedially effective. Section 9 amplifies the logistical problems of discharging treated water. Why are these higher-extraction alternatives being further discussed and evaluated?"

EPA Response: This comment is not correct in stating that "higher" extraction rates are not remedially effective. As shown on the figures in Section 7, extraction in Subarea 2 is effective at controlling migration within and downgradient of the Subarea and would remove significant contaminant mass. However, as explained in Response B, EPA chose not to propose or select extraction in this area.

Aj#209. "Although it is stated "Figure 12-1 illustrates the major advantages and disadvantages among the alternatives", review of Figure 12-1 indicates that all alternatives (with the exception of No Action) received the same level of ranking. This supports the above claim that EPA has failed to develop more than one remedial option. EPA has focused on variations of one remedial alternative with a range of extraction rates and two options for water disposal/usage. Please elaborate on the reference to the "major advantages and disadvantages presented in Figure 12-1" so that the reader may discriminate between differences, if present."

EPA Response: This comment duplicates a previous comment. See response to comment Aj#188.

Aj#210. "Due to the significant lack of data to characterize the actual distribution of chemicals in groundwater in the OU and EPA's inability to conduct valid groundwater modeling for the OU using the CFEST model, it is premature for EPA to state that "none of the remedial actions would exacerbate site conditions". Failure to focus on the extraction of groundwater at locations where the highest concentrations of chemicals have been identified in the OU, and instead to extract high volumes of groundwater more than 1-mile downgradient of this source area is likely to result in exacerbating the distribution of chemicals in Subarea 1, and further complicate and increase the time and cost for long-term aquifer remediation in the OU. Similarly, there is sufficient evidence to support the fact that high volumes of recharge at the SFSG and/or ISG resulting from the alternatives presented in the OUFS could further negatively impact a poorly developed remedial action which may be implemented without the necessary technical analyses."

EPA Response: We disagree with this comment, which duplicates previous comments. See Response F.

Aj#211. "What is the rationale for conducting groundwater modeling for 12.75-years?"

EPA Response: EPA developed its original computer model simulating groundwater flow in the San Gabriel Basin using a groundwater budget analysis that included data starting with the 1977-78 water year (beginning October 1, 1977) continuing through June 1984 (the most recently available pumpage data at that time). This 6.75-year period was selected to include a reasonable range of the hydrologic conditions encountered over the longer period of record. Subsequent model updates extended the model period through June 1990, for a total of 12.75 years. Because the annual San Gabriel Basin Watermaster Reports, which compile groundwater pumpage data, are completed for a period running from July through June of each year (and not the standard October through September water year), the model updates have always included a period that ends with 0.75 years.

See Appendix A of the Supplemental Sampling Program (SSP) Report for additional discussion of EPA's initial modeling efforts (EPA, 1986).

Aj#212. "Because the "No-Action" simulation was conducted with a groundwater flow model and not a contaminant transport model, it is incorrect to assume that contaminant concentration levels would increase in the particle tracked directions. Although small amounts of contaminants may be moving, processes such as dispersion and retardation could keep concentrations well below MCLs during that entire distance."

EPA Response: We disagree. The widely-accepted presumption is that contaminants move with groundwater. See Response A for a detailed response to the "no-migration" hypothesis.

Aj#213. "Figure 12-2 fails to adequately represent "Base Case" conditions in the OU. In contrast to EPA's simulations, independent groundwater modeling and particle tracking conducted using a local-scale groundwater model developed specifically for evaluating remedial alternatives in the OU indicate that the operation of VCWD's Arrow Highway and Lante well cluster do provide a considerable containment component for Subarea 1. In fact, modeling simulations conducted by others prior to the construction of wellhead treatment equipment at these locations support this independent conclusion."

EPA Response: EPA has simulated base case conditions, including operation of the Arrow/Lante well cluster. See response to comment Aj#145

Aj#214. "Please provide the data to support EPA's assumption "that significant extraction continues at only one existing well cluster that could help meet the remedial objectives of this OU". Other well clusters exist in the vicinity of Subarea 3. These wells have not been included in EPA's No-Action Alternative."

EPA Response: The quoted statement refers to the Arrow/Lante cluster, which is the only cluster currently extracting significant amounts of water within the OU Subareas. We agree that other well clusters exist in the vicinity of the Subarea that may be contributing, or may in the future contribute, to EPA's remedial objectives.

The last portion of the comment is incorrect. Wells located downgradient of Subarea 3 are included in the no-action alternative simulations.

Aj#215. "Please show the approximate limit of capture on Figure 12-2 similar to the method used for Figure 12-3."

EPA Response: A revised figure is attached (Figure RS-8) showing the approximate limits of capture for the no-action alternative.

Aj#216. "Please explain why the Arrow and Lante well cluster was not included with the computer simulations for the other Alternative scenarios presented in

the OUFS. The Arrow and Lante cluster should be incorporated into all scenarios considered for Subareas 1 and 2."

<u>EPA Response</u>: The comment is incorrect. This cluster <u>is</u> included in all computer simulations presented in the FS. See response to Aj#145.

Aj#217. "In contrast to EPA's broad conclusion "all of the remedial alternatives would be effective in meeting the remedial objectives of this OU including reducing the eventual cost, difficulty, and time required for containment or restoration of the aquifer" there exists serious risk that components of the Subarea 1 response action could further exacerbate both the areal and vertical distribution of contaminants and increase the complexity, eventual cost and time necessary for remediation."

<u>EPA Response</u>: This comment appears to duplicate previous comments, which refer to the proposed extraction scenario in Subarea 1. See Response F.

Aj#218. "Long-term effectiveness and permanence of remedial measures could be increased if extraction were proposed at "hot-spots" where contaminants are orders of magnitude higher than elsewhere in the OU. This also applies to the reduction of toxicity, mobility, and volume."

<u>EPA Response</u>: We agree that additional extraction in Subarea 1 (beyond that proposed by EPA) would speed the removal of contaminant mass from the aquifer. Any additional extraction in highly contaminated areas will remove contaminant mass. At issue, however, is whether additional extraction beyond that proposed by EPA is warranted given the significant cost of each incremental amount extracted.

See Response B for a more detailed explanation of tradeoffs of additional extraction beyond that proposed by EPA.

Aj#219. "Have additional simulations such as those presented in Section 7 confirmed that smaller extraction volumes are unacceptable? Why were these evaluations not shown and discussed?"

<u>EPA Response</u>: We believe that simulations *shown and discussed* in Section 7 demonstrate that smaller extraction volumes are unacceptable. As explained in Section 7, lower extraction rates would not be able to adequately meet EPA's remedial objectives for the presently-defined subarea boundaries and expected range of groundwater flow conditions. Results of simulations are shown in Sections 7 and 11.

Aj#220. "Potential financial impacts due to continued migration are unsubstantiated due to the uncertainties of contaminant transport."

<u>EPA Response</u>: We disagree. See Response A.

Aj#221. "Why is the assumed flow rate used in the assessment of air emissions 2 to 30 times larger than the flow rate assumed for any of the treatment

facilities included in the remediation alternative? These numbers should match the flow rate assumptions used in designing the treatment systems, for a more appropriate assessment of potential air emissions."

EPA Response: The evaluation of incremental risk from air emissions assumed a higher flow rate (70,000 gpm) than the remedial alternatives (19,000 to 29,000 gpm) because the air risk evaluation was completed before the development of the remedial alternatives. Because the sizes of the remedial alternatives were uncertain, the evaluation was completed assuming the largest size project under consideration (70,000 gpm), based on the logic that if there are insignificant risks associated with a 70,000 gpm project, there will be insignificant risks associated with any of the likely (smaller) project sizes.

The results of the evaluation are stated on page A.1-11:

> "The sum of the noncancer hazard quotients for the COPC is 0.05, below the level of concern for noncancer health effects. The estimated excess lifetime cancer risk for residential inhalation exposure is 3×10^{-6}, which meets the requirements of EPA and the SCAQMD."

The relatively low risk implies that repeating the evaluation with lower flow rates is unnecessary and would not be an efficient use of resources (unless other assumptions such as influent concentrations change significantly).

Commentor is concerned that readers may misinterpret the results of the air risk evaluation. The text clearly notes in the introduction *and* in the discussion of results that the assumed project size was "2 to 30 times larger than the flow rate assumed for any of the treatment facilities included in the remedial alternatives" (see pages A.1-1 and A.1-11).

Aj#222. "The text indicates that the chemical concentrations used in the air risk evaluation "differ somewhat" from the concentrations assumed in the evaluation of Alternative 4. Please discuss the effects of this inconsistency on the results of the predicted inhalation risks."

EPA Response: The effect of the difference is insignificant, particularly in relation to other factors affecting the risk estimate. (See A.1-11 for a discussion of these factors). This conclusion is obvious from a comparison of concentrations in Tables A.1-1 and 8-1. Using the concentrations from Table 8-1 instead of A.1-1 does *not change the cancer risk estimate* of 3×10^{-6}, rounding off to one significant figure.

Aj#223. "The SCREEN model used to conduct the air risk evaluation is a very conservative model that uses default meteorological data, rather than site-specific data. In addition, the conservative assumption was made that emissions from all 24 air strippers would originate from one "representative

stack", thereby significantly overestimating the emissions that would be expected to occur from a single stack or small group of stacks. Although the document does point out that the assessment is conservative, nevertheless, elevated concentrations of carcinogenic and noncarcinogenic chemicals have been estimated at an offsite MEI location. Hypothetical health risks at this location were predicted to be in excess of 1 x 10^{-6}, suggesting that T-BACT would be necessary to control the emissions (based on the bullets listed on p.A.1-10). It is unclear whether the results of this screening assessment will be used to require T-BACT for the project. The results of the air risk evaluation indicate only that the estimated risk of 3 x 10^{-6} "meets the requirements of EPA and the SCAQMD". Clearly, based on the conservative assumptions used in the assessment, the "actual" health risks associated with the air stripper emissions are expected to be well below 10^{-6}, indicating that T-BACT would not be necessary for the protection of human health in the area."

EPA Response: As stated on page A.1-11, the project, when constructed, is likely to differ in flow rate and treatment facility configuration from assumptions made in the air risk evaluation. If these or other parameters differ significantly from assumptions made in the air risk evaluation, the evaluation may not be directly applicable to the project as constructed.

Aj#224. "The *OUFS* should more thoroughly discuss the overestimations and highly conservative assumptions made in the assessment, and clearly spell out to the public that there will NOT be 24 stacks located together, that people do NOT live at one location for 70-years (EPA indicates for health risk assessments that the 90th percentile duration of residence is 30-years; this value should be used in the risk assessment), that the VOCs are readily degraded in the atmosphere, and that the flow rate used in the analysis is up to 30 times more conservative than the expected flow rate of any of the proposed the stripper system(s). Overall, the public should be informed that this assessment is extremely conservative, and that if a refined analysis were conducted, the predicted health risks would likely be lowered by several orders of magnitude."

EPA Response: These assumptions are noted in Appendix A, as is the conservative nature of the air risk evaluation.

Aj#225. "Conducting a screening assessment of this nature unnecessarily raises public concerns, and can result in increased project costs due to the use of unnecessary pollution controls, as well as increased risk communication to ease public concerns. The document should clearly discuss and interpret the results of the risk assessment, and clearly indicate that additional pollution controls (i.e., T-BACT) are NOT expected to be necessary for the protection of human health in the project area."

EPA Response: This comment duplicates previous comments. See response to comments Aj#221-224.

Aj#226. "EPA has indicated that route-to-route extrapolation should not be conducted for chemicals without toxicity data for a specific pathway. Because of the significant uncertainties associated with this approach, EPA has developed RfCs for many chemicals (so that route-to-route extrapolation will not be necessary). In the air risk evaluation, route-to-route extrapolation was conducted for all chemicals without RfCs; using this approach, toxicity data for 8 of the 14 chemicals evaluated in the air risk evaluation was extrapolated on the basis of oral toxicity. The document should clearly

discuss the basis of the extrapolation for each chemical, and the toxicity data used to estimate inhalation toxicity values."

EPA Response: Route to route extrapolations were used when there were no noncancer toxicity values available for the inhalation route (i.e., oral reference doses [RfDs] were used for inhaled exposures for organic compounds that lack inhalation reference concentrations [RfCs]). This methodology is consistent with EPA Region IX guidance (see USEPA. Region IX Preliminary Remediation Goals (PRGs), Fourth Quarter 1993, 11/1/93). Although this methodology may introduce additional conservatism in the risk assessment, the estimated noncancer hazard index for exposure to air stripper emissions is well below the EPA's target hazard index of 1.

Aj#227. "There is currently no RfD for TCE; both Table A.1-5 and p. A.1.2-1 list an RfD of 0.006; this value actually represents the new ECAO inhalation slope factor for the chemical. The RfD should be deleted, and the results of the analysis should be changed accordingly."

EPA Response: The comment is incorrect. See response to comment Aj#89.

Aj#228. "The air risk assessment uses different toxicity values (e.g., RfC) and intake assumptions (e.g., duration of residency of 70-years) for most chemicals than those assumptions used in the health risk assessment in Section 4. It is unclear why two different approaches for assessing potential health risks were used."

EPA Response: Commentor is incorrect. The inhalation toxicity values used in the Appendix A and Section 5 are exactly the same. [We presume that commentor intended to refer to Section 5, "Preliminary Baseline Risk Assessment," not Section 4, "Identification of Applicable or Relevant and Appropriate Requirements."] However, in Appendix A, inhalation values are expressed in units of mg/m^3 and in Section 5 inhalation toxicity values are expressed in units of mg/kg/day. To convert from units of mg/m^3 to mg/kg/day, a breathing rate of 20 m^3/day and a bodyweight of 70 kg is assumed.

To calculate inhalation cancer risks for exposure to air stripper emissions, the inhalation cancer slope factors were multiplied by the estimated air concentrations. This is a conservative calculation in that it does not take into account an exposure duration of less than a lifetime. To estimate excess lifetime cancer risks for an exposure duration of 30 years, the estimated cancer risks presented in Appendix A may be multiplied by 0.43 (30/70).

Aj#229. "The air risk evaluation should clearly state that if all cancer risks were summed considering the cancer WOE, that predicted health risks (even under the worse-case assumptions used) would not significantly exceed 10^{-6}. Summing all known, probable, and possible human carcinogens together as if

they are all "known" human carcinogens is not consistent with standard risk assessment practices. If summation of all carcinogenic chemicals was done because a "screening" risk assessment was conducted, it should be clearly pointed out to the public that this practice will result in an overestimation of predicted health risks."

EPA Response: EPA's method is consistent with standard risk assessment practices. EPA guidance recommends calculating a pathway-specific cancer risk estimate and hazard index by summing the contributions of each chemical in the pathway (see EPA "RAGs" guidance (EPA/540/1-89/002) and EPA Region IX supplement (December 15, 1989)). This method of estimating risk includes the assumption of independence of action by the compounds involved (i.e., no synergistic or antagonistic chemical interactions) and gives equal weight to all classes of carcinogens. The summation of upper bound estimates of excess lifetime cancer risk can introduce additional conservatism in the risk assessment, this conservatism is acknowledged in the risk assessment in Section A.1.3.3, Risk Characterization. In addition, the weight of evidence classification for all carcinogens is listed in Table A.1-5.

Aj#230." It is unclear why health risks for VOCs and radon were conducted in a different manner. It appears that an exposure duration of 70-years was used for the VOCs, while a duration of 30-years was used for the radon. This inconsistency should be corrected; a value of 30-years exposure duration should be used for all chemicals."

EPA Response: See response to comment Aj#228.

Aj#231. "A "Results" section should be added to the air risk evaluation, that clearly points out that the risks predicted from inhalation of each site-related COC are less than 10^{-6}; only risks from naturally occurring radon equals this value."

EPA Response: Risk estimates for each compound are clearly summarized in Table A.1-6.

Aj#232. "The risk assessment for radon should be removed from the assessment of site-related risks. Radon is naturally occurring, and is not site-related. It is inappropriate to sum risks from both site-related and naturally occurring chemicals in the assessment, without clearly explaining to the public that risks from exposure to radon are related to background conditions in the area. By presenting the risks associated with radon separately from risks associated with site-related chemicals, the public can be informed that the risks from this chemical have been considered, however, do not have a direct bearing on the remediation proposed for the OU."

EPA Response: We disagree with commentor's recommendation that risk resulting from radon be ignored or hidden in the risk assessment. Radon is naturally-occurring *and* "site-related" in that its presence contributes to the risk that would be experienced by those exposed to air emissions from the selected remedy. All risks resulting from implementation of a remedial action in the Baldwin Park area "have a direct bearing" on EPA's proposal, regardless of the contaminant's origin. Table A.1-6 allows interested readers to discern the risk contribution from radon and other individual compounds of concern.

Aj#233. "The Polopolus well has a very shallow screen depth. Was this considered in the evaluation? The well is only 0.5-mile upgradient of the EPA multi-port monitoring well which detected the higher contaminant concentrations several hundred feet below the equivalent Polopolus well intake. Why wasn't this well sampled more often in the last 13-years? It is located in the center of the main area of VOC contamination."

EPA Response: The contaminant data from the Polopolus well were not adjusted in any way to account for the relatively shallow depth of this well. It should be noted that, as shown in Figure 3-9, depth-specific sampling indicated that contaminant concentrations were fairly uniform across the upper several hundred feet of the aquifer upgradient of the Polopolus well.

Although it is certainly possible that higher concentrations are present deeper into the aquifer at the Polopolus well location, EPA's monitoring well MW5-1 is not directly downgradient of the Polopolus well (it is more cross gradient). Thus, the distribution of contamination at the two locations would not necessarily be expected to be similar.

Unlike most of the production wells in the basin, because the Polopolus well is a privately-owned irrigation well, state-mandated sampling under Title 22 is not required. EPA has sampled the well during each EPA-sponsored sampling event in the basin (1985, 1987, 1990, and 1991).

Aj#234. "Attachment A contains water quality data from some wells through November 18, 1991, not November 7, 1990 as indicated in the text. Are all data from November 1990 to November 1991 included?"

EPA Response: November 7, 1990 is the cutoff date for sampling data used to develop influent water quality estimates. November 18, 1991 is the cutoff date for data included in the original Attachment A (an updated Attachment A containing data through 10/93 has been added to the Administrative Record). The cutoff dates differ because, as stated in Attachment A and elsewhere in these responses, as the FS progressed, different cut-off dates were used for the water-quality data incorporated into various evaluations (based on available data at the time the evaluation was performed).

Aj#235. "These two wells [SGVWC B6] are located at the downgradient portion of Subarea 3. The document comments [in Appendix B] that pumping rates and durations may control the VOC concentrations in those wells, suggesting that pumping is pulling contaminants downgradient. Decreases in pumping might result in a receding plume."

EPA Response: We agree that production at the B6 wells influences the local groundwater flow gradient. (It should be noted that these two wells have been inactive for approximately four years.) However, it is unclear how the conclusion could be drawn that reduced pumping might result in a "receding plume." Even with no pumping from these wells, regional groundwater flow directions (and thus, contaminant migration) are towards this well cluster from upgradient in the OU area. Consequently, reduced pumping would not cause contaminant migration to change directions or "recede" in the upgradient direction.

Aj#236. "Were the relatively high concentrations of other inorganics, such as TDS, factored into the treatment costs? Background inorganic water quality for the San Gabriel Basin is characterized as "hard" water and may result in added costs."

EPA Response: The inorganic quality of groundwater in the OU area was considered in the treatment evaluations.

Aj#237. "Because of the risk of pulling nitrates from the east with high pumping rates, it is essential to conduct detailed analyses to recommend the lowest possible extraction rate that will accomplish all of the objectives."

EPA Response: We agree.

Aj#238. "If the proposed extraction location in Subarea 1 was moved to the area of highest contamination, (north of the I-210 freeway), the predicted ground surface elevation at the well would increase more than 50 feet. This additional elevation may facilitate the surface conveyance to the City of Azusa reservoirs."

EPA Response: Comment noted.

Aj#239. "Additional contaminant characterization should be included as an objective. Current characterization is incomplete in all areas of the OU:

- **o Vertical distribution is unknown in Subarea 1.**
- **o Subarea 2 is defined only by four wells, three production wells and one monitoring well.**
- **o There are no monitoring wells in Subarea 3. Vertical and areal distributions of contaminants are uncertain.**

Much of this characterization is necessary prior to selecting a remedy."

EPA Response: We agree that additional contaminant characterization is a key objective of the monitoring program. This was one of the criteria used in identifying the recommended monitoring well locations and should have been included in this list. An updated table is included in this Responsiveness Summary (Table RS-3) to provide additional information on the purpose of each new monitoring well cluster.

We agree that the monitoring program must be one of the first steps during the time of remedial design. We do not, however, agree that the monitoring program must precede remedy selection. As stated previously, adequate information has been collected and is presently available to select a remedy for the Baldwin Park OU. See Response F for additional details.

Aj#240. "MW-5-07 and 08000039 appear redundant. Well 0800039 can be used as early warning for Cluster 5."

EPA Response: Production well 08000039 is located over 3,600 feet upgradient of the assumed Cluster 5 extraction location. This was considered too far upgradient to provide reliable early warning data for changes in contaminant conditions. In addition, monitoring well clusters, rather than production wells, are preferred for the early warning clusters to provide better data on the vertical distribution of contaminants.

Aj#241. "MW5-02 should be located farther downgradient and used to supplement the other downgradient wells that have varying screen depths."

EPA Response: The purpose of MW5-2 is to help monitor the remedial effectiveness of Subarea 3 extraction by observing changes in contaminant conditions just downgradient of the Subarea. The downgradient production wells referred to in the comment will provide additional information to supplement data from MW5-2, but are a bit further downgradient than desired for monitoring remedial effectiveness in Subarea 3.

Aj#242. "The timing and purpose of the proposed monitoring wells should be revised. Several of these wells should be installed initially, monitored, and used to revise the contaminant characterization. Only then should extraction location and pumping be finalized."

EPA Response: We agree that the new monitoring wells should be used to update our understanding of the extent of contamination in the OU area. And, as described previously, the extraction locations and rates will not be finalized until data have been gathered from the monitoring program.

Aj#243. "This discussion (p.E-9) amplifies the need for additional data from the monitoring program, yet none of these program wells have the stated purpose of additional aquifer characterization."

EPA Response: The FS recommends approximate type, number, and location of wells, but it is not its purpose to serve as a workplan for the installation or sampling of wells. After the Record of Decision is completed, EPA or Potentially Responsible Parties will prepare a detailed workplan for the installation and operation of the monitoring network. Data on aquifer properties will certainly be collected during monitoring well installation.

Aj#244. "How does the role of the San Gabriel Basin Water Quality Authority blend or overlap with agency responsibilities? Since they are involved in

groundwater quality projects in the basin, their role and responsibilities should be included."

EPA and staff of the San Gabriel Basin Water Quality Authority periodically meet to coordinate investigation and clean up actions in the Baldwin Park area and in other parts of the Basin. The Authority, however, as an independent agency established by State legislation, reaches its own decisions on how to contribute to the cleanup. Our current understanding is that the Authority intends to complete installation of wellhead treatment at the Big Dalton well. We suggest that you contact the Authority directly for more detailed information about their planned activities.

Aj#245. "Are both the Arrow and Lante wells pumped at capacity during the simulations? Simulations in Section 7 show the significance of this pumping."

EPA Response: The extraction rate assumed for these wells in all simulations is 3,000 gpm, plus the existing pumping rate from the Lante well during the three-year period of existing extraction incorporated into the simulations. The 3,000 gpm flow rate was based on discussions with the water purveyor regarding the planned use of the new Arrow Highway treatment facility.

Aj#246. "Are any of the simulations with increased recharge shown or discussed in this document? If not, why not?"

EPA Response: Yes, see Figure 11-2 and accompanying text on pages 11-6 and 11-9.

Aj#247. "Given the discussion of the importance of secondary sources and the limitations of particle tracking to evaluate this condition, why wasn't one of the simulated extraction locations in Subarea 1 moved to the area suspected of containing secondary sources?"

EPA Response: This comment duplicates previous comments recommending additional extraction upgradient of EPA's proposed locations in the upper area. See Response B.

Aj#248. "There are references in the OUFS about recent sampling in the Baldwin Park key well (Z1000006), yet no data from this well are included in Attachment A."

EPA Response: This comment duplicates a previous comment. See response to comment Aj#15.

Aj#249. "Data from EPA Well MW611-19 are included in Attachment A. Is this well in the OU?"

EPA Response: Data included in Attachment A are from wells in or in the vicinity of the areas of known contamination. EPA Well MW611-19 meets this criterion.

Aj#250. "Figure 1-4 indicates that EPA has conducted recent groundwater sampling at Wells 01900831 and 01902971. However, data from these wells are not included in Attachment A."

EPA Response: This comment duplicates a previous comment. See response to comment Aj#15.

XVII.2 Response to "Review Comments, Proposed Plan, May 1993, Baldwin Park Operable Unit"

Aj#251. In this submittal, Aerojet/ALR repeat the same complaints, criticisms, and assertions made in their comments on the Baldwin Park Operable Unit Feasibility Study. They criticize EPA's Proposed Plan as "based on simplifying assumptions that are not technically defensible." They assert that EPA "fail[s] to consider local variations in the groundwater flow regime and the effects of the proposed remedy on local groundwater flow and contaminant transport"; "fails to incorporate strategic source control measures"; "fails to recognize the benefits of existing wellhead treatment facilities"; "fails to adequately accurately [sic] describe "Base Case" hydraulic conditions..."; "fail[s] to optimize the effectiveness of proposed project and thereby limited remediation objectives"; and, finally, that EPA's proposal risks "damage to the groundwater resource."

They continue, asserting that a "detailed review of the rationale provided and the available data for the OU indicates that basis for the proposed response action in unsubstantiated and appears to be driven by schedule..."; that "EPA's groundwater modeling results are not sufficiently detailed to simulate the effects of current and historic pumping and recharge patterns upon flow conditions in Subareas 1 and 3"; that "EPA has failed to demonstrate the need for additional migration control actions in downgradient areas (Subarea3)..."; and includes "distorted" risk estimates and "exaggerated" claims of the costs of not taking action.

EPA Response: These comments duplicate previous comments. See summary response to Aerojet/ALR general comments on the Baldwin Park Operable Unit Feasibility Study and responses to approximately 250 specific comments that follow the general comment. EPA believes that the majority of these comments make incorrect assertions or reach unsupported conclusions, and do not warrant any changes in EPA's proposed remedy.

Aj#252. In its comments on EPA's proposed remedial action in Subarea 3, Aerojet/ALR assert that EPA has not demonstrated that the proposed remedial action in Subarea 3 is needed to meet EPA's stated remedial objective. They cite "independent analyses" completed by Camp Dresser & McKee, consultants to the San Gabriel Basin Industry Coalition, hypothesizing that the plumes have *stabilized* or *reached equilibrium*. They also assert that "a broad non-detectable area of TCE and PCE exists between the downgradient margin of Subarea 3 and Whittier Narrows." Lastly, they assert that EPA's remedial objective for Subarea 3 contradicts a statement in the FS that "available data do not show any significant change in contaminant levels downgradient of Subarea 3 to as far as Whittier Narrows."

EPA Response: The "independent analyses" completed by Camp Dresser & McKee are speculative, largely unsupported by site-specific data, based on misinterpretations of data (e.g., mistakenly alleging oscillation and retraction of the plumes) and fail to consider site-specific evidence refuting their *plume equilibrium/no action* hypothesis. See summary response to Aerojet/ALR general comments on the Baldwin Park OU Feasibility Study and Response A for a detailed explanation of the need for action in Subarea 3.

Also, we agree that neither TCE nor PCE have been detected at some wells downgradient of Subarea 3, but would not characterize the area of non-detects as *broad* due to the paucity of sampling locations in this area. We also note the presence of other contaminants at levels above MCLs (e.g., carbon tetrachloride) at wells where neither PCE nor TCE have been detected.

Finally, we are unclear of any contradiction between EPA's stated remedial objectives and the referenced statement. Contaminant concentrations within Subarea 3 are higher than concentrations downgradient of the subarea, indicating possible benefits of remedial action to prevent the more contaminated groundwater from migrating into less contaminated downgradient areas. The referenced statement notes that there is not a "significant change in contaminant levels from just downgradient of Subarea 3 to as far south as Whittier Narrows." Contaminant concentrations of different compounds at various wells in the interval from just downgradient of Subarea 3 to the Whittier Narrows area are generally at or near MCLs. Thus, as stated in the text, there is not a "significant change" in overall contaminant levels within this stretch. Also see response to comment Aj#130.

Aj#253. In its comments on EPA's proposed remedial action in Subarea 1, Aerojet/ALR note the distance between well W10WOMW1 and EPA's recommended extraction locations, and asserts that EPA's recommended extraction locations in Subarea 1 may "exacerbate the migration of chemicals from the highest concentration source areas to less contaminated areas..."

EPA Response: EPA believes that its recommended extraction locations represent an effective strategy for limiting the migration of contamination detected at well W10WOMW1. See Response B for a detailed explanation of the rationale for EPA's recommended extraction locations.

Aj#254. Aerojet/ALR also assert that EPA failed to identify the hydraulic capture zones present from the operation of the Arrow and Lante wellhead treatment facilities and did not adequately account for localize changes in groundwater flow direction and gradients that have been documented in response to recharge events at the Santa Fe Spreading Grounds.

EPA Response: These assertions is incorrect; EPA did assume continued extraction at the Arrow/Lante wells and did account for recharge at the Santa Fe Spreading Grounds. Aerojet/ALR in fact acknowledge that EPA accounted for extraction at the Arrow/Lante location. See response to comments Aj# 143 and Aj#145, and Response B.

Aj#255. Aerojet/ALR recommend that the "Subarea 1 response action must consider both mass removal of chemicals per volume of water extracted and migration control, and optimize extraction to achieve both objectives. Source control is a prerequisite to optimize the effectiveness of groundwater remediation in Subarea 1."

EPA Response: We agree that migration control and mass removal are both remedial objectives for the Baldwin Park OU. See Response B for additional details on how these objectives will be translated into extraction rates, locations, and other project details. We also note that EPA's proposed extraction and treatment in Subarea 1 would provide significant "source control."

XVII.3 Response to "Proposal for Technical Modifications Optimization of U.S.EPA Region IX Subarea 1 Proposed Project, Baldwin Park Operable Unit"

Aj#256. Aerojet/ALR state that "Although data deficiencies also exist in Subarea 1, an interim action that specifically targets source control appears feasible at the present time. Aerojet/ALR state, however, that concentrations of PCE and TCE in groundwater at wells OSCOMW2 and W1OWOMW1 are "the highest concentrations identified in Subarea 1 by at least an order of magnitude, yet EPA' closest extraction location, Cluster 10, is located up to 1-mile downgradient of these evident hot spots."

Aerojet/ALR assert that "EPA's Subarea 1 proposed project ... does not address source control, and in fact will likely exacerbate the spread of contaminants from "hot spots" into less contaminated zones of the aquifer." Aerojet/ALR describe their analysis of groundwater flow and water quality, their computer modeling efforts, and recommend that EPA relocate recommended extraction locations as shown in the submittal (Plate 18) to "optimize the efficiency of contaminant removal by at least an order of magnitude, while maintaining EPA's goal for containment in Subarea 1." The three recommended locations are:

- **in the vicinity of well W1OWOMW1 (suggested rate = 3,000 gpm)**
- **in the vicinity of well OSCOMW2 (suggested rate = 4,000 gpm)**
- **along Gladstone Street northeast of EPA's proposed 10 and 13 clusters (suggested rate = 2,000 gpm)**

They argue that their recommendations would "prevent the spread of contaminants from "hot spots" into less contaminated zones of the aquifer ... and will ultimately decrease both the time and costs required for remediation not only [in] Subarea 1, but throughout the OU."

EPA Response: See Response B for a detailed rebuttal to criticisms of the pumping configuration in EPA's Subarea 1 proposed project, including the value of the additional extraction in the vicinity of well W10WOMW1.

Because the Record of Decision recommends, but does not require, groundwater extraction rates and locations, EPA has not completed a detailed review of the computer modeling or other analyses carried out in support of the proposal to replace EPA's recommended extraction rates and locations with less extraction in the vicinity of well OSCOMW2 and along Gladstone Street. Our own evaluations lead us to expect that extraction in the vicinity of well W10WOMW1 will remove contaminant mass, but will not contribute to EPA's objective of limiting migration of contaminated groundwater out of Subarea 1. If so, then commentor is proposing to substitute 6,000 gpm of extraction at well OSCOMW2 and along Gladstone Street in place of the 8,500 gpm that EPA's evaluations indicate is necessary. In their submittal, commentor does not identify what differences in hydraulic conductivity, differences in interpretation of the extent of contamination, or other differences justify their assertion that they can extract approximately 30% less groundwater and still satisfy EPA's migration control objective. Also see response to Aj#130.

Aj#257. Aerojet/ALR repeat their assertion that "Technical evaluations strongly indicate that the proposed project in Subarea 3 is without technical justification, and requires additional data collection and further analysis prior to remedy selection."

EPA Response: We disagree. See Response A.

Aj#258. Aerojet/ALR claim that in their computer simulations "the magnitude of simulated fluctuations is typically within 5 to 10 feet of measured fluctuations, and only once varies as much as 18 feet." They claim that this level of accuracy is "significantly greater than the 20- to 30-foot range of variations evident in EPA's calibration results for the CFEST model." [p.21]

EPA Response: EPA has not reviewed Aerojet/ALR's modeling results in detail, but Plate B-3 in their submittal appears to indicate that calibration results for the Key Well are in the 5 to 15 foot range. Contrary to Aerojet/ALR's claim, this result is not significantly better than EPA's calibration results for the Key Well (shown in Figure C-8 of the Interim RI Report), which generally range from 5 to 20 feet (not the 20 to 30 feet claimed in the comment).

XVII.4 Response to 18 page letter with "General comments on and legal analysis of the Baldwin Park OU FS and Proposed Plan," dated August 10, 1993,

Aj#259. The primary theme of this set of comments is the assertion that there are "insufficient data to prepare, screen, evaluate and select appropriate remedial alternatives." This set of comments also duplicates comments provided in other Aerojet/ALR submittals on the "plume stabilization" hypothesis; on whether EPA adequately considered the effects of an existing wellhead treatment project; on whether EPA considered the impacts of recharge at the Santa Fe Spreading Grounds; and on the adequacy of EPA's computer modeling. One apparent difference between this set of comments and other comments is an escalation of the rhetoric used to criticize EPA's proposal. Among the comments directed at EPA's proposal are that it is "discredited" by previous EPA inaction; rationalized by "dogmatic assertion" rather than "existing evidence or reasonable inferences," based on "misleading" predictions and analysis that is "fundamentally flawed"; and that it "violates basic tenets of rational decision-making."

EPA Response: Despite the flamboyant rhetoric, these comments duplicate comments made in other Aerojet submittals and responded to in this Responsiveness Summary. See Response F for a summary of EPA responses to Aerojet/ALR's assertion that EPA's selected remedy is not supported by adequate data or technical analysis, and responses to specific comments included in other Aerojet/ALR submittals.

Aj#260. Aerojet asserts repeatedly that "There is no RI for the Baldwin Park Operable Unit."

EPA Response: This claim is ridiculous. Commentor interprets EPA's decision to omit the words *remedial investigation* from the title of the Baldwin Park Operable Unit Feasibility Study as implying that no remedial investigation was conducted. As explained on page one of FS:

> "The report also summarizes remedial investigation (RI) activities completed in the OU area; more detailed descriptions are available in separate reports (see Section 1.5)."

As explained throughout the Feasibility Study and this Responsiveness Summary, the remedial investigation for the Baldwin Park OU included the collection and analysis of data from hundreds of water supply and monitoring wells installed by water purveyors and businesses; groundwater sampling performed as part of EPA's Supplemental Sampling Program; four rounds of basinwide groundwater sampling completed by EPA in 1988; two rounds of wellhead sampling at existing wells in 1990-91; well logging and depth-specific sampling of eight wells in the Baldwin Park area by EPA in 1989-91; installation and initial sampling of a 1,540-foot-deep multiport (MP) monitoring well by EPA in Baldwin Park in 1991; evaluations of the quality of EPA-collected and other groundwater data; analyses of the hydrogeology, water budget, water supply infrastructure, occurrence and movement of VOCs, and occurrence of nitrate in the Baldwin Park area; the development and use of a computer model of groundwater flow in the basin; as well as analyses of treatment technologies, water distribution options, and other components of the Baldwin Park OU remedy.

XVII.5 Response to two videotapes titled "Aerojet Submission of Nicholas Pogencheff Testimony, August 4, 1993" [Edited, approximately 3 hours in duration].

Aj#261. Aerojet submitted three hours of edited videotaped "testimony" in which Nicholas Pogencheff, consultant to Aerojet Gencorp, is apparently interviewed by Peter Taft, an attorney representing Aerojet.

EPA Response: The videotapes largely duplicate written comments provided by Aerojet Gencorp. They include minor errors in their explanation of how the San Gabriel Basin is managed (e.g., they incorrectly state that groundwater is not exported from the Basin; they incorrectly identify the San Gabriel Basin operating limits as 200 feet to 300 feet (actual limits are 200' to 250')); they include errors in their description of how contaminants move from the surface to the groundwater (e.g., they comment at length on the presence of surface sources of contamination, hypothesizing that surface spills or releases have decreased over time, but fail to acknowledge the continued presence of significant subsurface sources of contamination); and they make numerous errors in describing EPA modeling efforts. We repeat here and respond to only selected comments from the videotapes.

- Aerojet correctly identifies ways in which EPA could have increased the complexity and cost of its computer simulations (e.g., increasing the number of *nodes* and *cells* in the model), and offers hypothetical examples in which a more complex model would be appropriate, but does not demonstrate the need for a more complex model as part of the Baldwin Park OU. See Response C for additional details.

- Aerojet criticizes simulations of groundwater flow and contaminant transport completed by EPA in the 1980s and presented in Appendix C of the Interim RI Report. These simulations have no bearing on the Baldwin Park OU remedy. In their criticism of past EPA simulations, Aerojet asserts that there are no continuing surface or subsurface sources of groundwater contamination in the Baldwin Park area. This criticism is without merit. Significant evidence indicates the presence of continuing subsurface sources in the Baldwin Park area, in the vadose zone and as non-aqueous phase contamination in the vadose and saturated zones. Aerojet offers no data or analysis to the contrary. See Response B.

• Aerojet asserts repeatedly that their interpretation of the hydraulic conductivity of the Baldwin Park area is more accurate than EPA's assumed distribution of conductivity. See Response A (Table of Baldwin Park Area Hydraulic Conductivity Estimates and accompanying text) and response to comments Aj#17-21 for a rebuttal to this assertion.

• Aerojet correctly notes that EPA used its computer model to simulate the movement of groundwater in the Baldwin Park area and did not attempt to simulate contaminant fate and transport processes (e.g., dispersion and retardation). As noted elsewhere in this Responsiveness Summary, EPA does not believe that it is necessary to simulate contaminant fate and transport to evaluate or select an interim remedy for the Baldwin Park OU. EPA does not state, and did not intend to imply, that contaminants move at the same rate as groundwater. In its comments, Aerojet laments EPA's decision to not simulate transport processes but does not identify any ways in which EPA's decision affects the selection of remedy.

• Aerojet discusses a "historical matching" exercise completed during the development of their computer model in which they acquired quarterly measurements of groundwater levels in the Baldwin Park area over a 14 year period. They also describe the resulting "good fit" between simulated and actual water levels. EPA completed a similar effort, which made use of quarterly water level data collected over a 12 year period and also resulted in a "good fit." Also see response to Aj#258 and Response C.

• Aerojet states that "we have no idea what the areal extent [of groundwater contamination] north of that high concentration [detected at monitoring well W10WOMW1]." Data are available, and were included in the Baldwin Park FS, from at least half a dozen wells north of W10WOMW1. Also see Response B for a detailed discussion of EPA's interpretation of the distribution of contaminants in the Baldwin Park area.

• Aerojet incorrectly asserts that EPA did not account for the impacts of artificial recharge (*spreading*) at the Santa Fe Spreading Grounds on the movement of groundwater in the Baldwin Park area. Aerojet builds on this incorrect assertion in alleging that this deficiency results from the "regional scale" of EPA's computer model. EPA considered recharge at the Santa Fe Spreading Grounds in the development of its remedy and depicts its effects in the FS. EPA's recommended extraction rates and locations will limit migration during periods of significant recharge at Santa Fe Spreading Grounds. See response to comments Aj#143 and 179.

• Aerojet recommends extraction at or near well the Wynn Oil and OSCO "sources," criticizing EPA's recommended pumping configuration for not maximizing mass removal and accelerating the migration of potential "hot spots." We disagree with this recommendation, which we discuss in detail in Response B. Aerojet retracted this recommendation in subsequent comments. See response to comments Aj#262-271.

• Aerojet incorrectly asserts that EPA ignores the influence of the Arrow/Lante projects on the movement of groundwater and contaminants in the Baldwin Park area. See response to comments Aj#144 and 145.

• Aerojet incorrectly asserts that the reclaimed water project proposed by the Upper San Gabriel Valley Municipal Water District would have a negative impact on the Baldwin Park remedy. See response to comment Aj#182.

XVII.6 "Addendum to Proposal for Technical Modifications Optimization of U.S. EPA Regional IX Subarea 1 Proposed Project Baldwin Park Operable Unit," November 29, 1993 and 4 page cover letter dated December 2, 1993 [SUBMITTED AFTER THE CLOSE OF THE PUBLIC COMMENT PERIOD]

In this submittal, Aerojet, ALR, and the Oil and Solvent Process Company (OSCO) change Aerojet/ALR's previously suggested locations and rates of groundwater extraction in Subarea 1. They claim that "new data" available after the close of the public comment period indicating a decrease in contaminant concentrations in the vicinity of OSCOMW2 necessitate the change.

Aj#262. One of Aerojet/ALR/OSCO's arguments for changing their previously recommended extraction rates and locations is that the "1992-93 winter was the first substantial wet period in ten years."

<u>EPA Response</u>: This statement is incorrect. Rainfall, and artificial spreading, in the previous winter of 1991-92 were also substantially higher than average.

Aj#263. Aerojet et. al. refer to monitoring well results from the Aerojet and OSCO wells and other "new data available only after the close of the public comment period" that imply the need to modify previously recommended extraction rates and locations. They state that the "early pattern [of water quality data] suggested a source area ... [along] Motor Avenue near OSCO area"

but that more recent data suggest that recharge "overwhelm[s] the source or sources."

EPA Response: We disagree with the conclusion that recent sampling data argue against extraction of contaminated groundwater in the vicinity of the OSCO wells.

EPA's recommended pumping configuration includes extraction of contaminated groundwater downgradient of the OSCO facility because the available groundwater, vadose zone, and chemical usage data indicate the presence of a continuing subsurface source of contamination in the vicinity of the OSCO facility. The "new data" cited by Aerojet/ALR/OSCO do not dispute this view. The "new data" do show decreases in concentrations of some contaminants at the OSCO wells, temporarily complicating the interpretation of these water quality data, but the data do not in any way indicate that the source or sources of contamination have disappeared or even diminished. The observed decreases in contaminant concentrations most likely reflect dilution of contaminated water by clean recharge water, as varying groundwater flow directions temporarily cause wells that were downgradient of the contaminant source to be more cross-gradient. The effect is likely to be temporary, however. We expect that the wells will resume their downgradient relationship to the source (and contaminant levels will rise) as recharge decreases and groundwater flow direction resumes its more typical northeast to southwest orientation.

Commentor refers to water quality data collected during May 1993. These data reflect the influence of much higher than average volumes of recharge at the Santa Fe Spreading Grounds during May and the preceding several months, as summarized below. The listed volumes were provided by Los Angeles County Department of Public Works.

Volumes of Water Recharged at the Santa Fe Spreading Grounds in 1992-93

Month	Volume Recharged (acre-feet)
Oct 92	133
Nov 92	5,560
Dec 92	1,670
Jan 93	6,700
Feb 93	6,160
Mar 93	14,310
Apr 93	18,010
May 93	*12,830*
Jun 93	799
Jul 93	0
Aug 93	2,420

Sep 93	6,000
Oct 93	7,110
Nov 93	0
Dec 93	0
Jan 94	0
Feb 94	0

Aerojet/ALR/OSCO do not actually list or summarize any "new data" and do not provide any clear statements as to how the "new data" justify eliminating extraction in the vicinity of the OSCO facility. The closest the comment comes is in noting fluctuations in contaminant concentrations at the OSCO wells and stating that recharge "overwhelms the source or sources." We are unsure of the meaning of the word *overwhelm* in the comment. We agree with the comment to the extent that it refers to more recent data complicating, at least temporarily, our ability to *interpret* water quality data from the OSCO wells. We disagree with the comment to the extent that it implies that recharge has moved, diminished, or eliminated subsurface sources of contamination in the area.

Aj#264. In discussing their modeling efforts, including Plate 3 of their submittal purporting to illustrate the impact of EPA's recommended extraction rates and locations, Aerojet et. al. claim that EPA's recommended extraction rates and locations in Subarea 1 "results in accelerating the spread of contaminants from Well W10W0MW1 during wet conditions, with no downgradient containment to inhibit contaminant migration." (p.4)

EPA Response: In response to the first portion of the comment (asserting an *acceleration* of the spread of contaminants), we note that groundwater extraction always accelerates the movement of groundwater and contaminants within its zone of drawdown, regardless of regional flow conditions. In response to the second portion of the comment (asserting the absence of *downgradient containment* to inhibit contaminant migration), we offer EPA's particle tracking simulations which indicate that its recommended extraction rates and locations will inhibit contaminant migration from Subarea 1 during all expected flow conditions. The simulation results presented by Aerojet et. al. as Drawing 3 do not offer any evidence to the contrary. As discussed in response to comment Aj#266, we do not believe that the results presented in Plate 3 (as wells as Plates 1-6) realistically simulate regional flow conditions in the Baldwin Park area.

Aj#265. Aerojet et. al. recommend the following changes (from their August 1993 submittal) in extraction rates and locations:

- **reliance on 4000 gpm extraction at the existing Arrow/Lante cluster to limit the migration of contaminated groundwater from Subarea 1 in place**

of a new well along Gladstone Avenue (and in place of EPA's recommended pumping configuration).

- **retraction of the proposal to install a new extraction well in the vicinity of OSCOMW2**

- **reduction in the recommended extraction rate at the new extraction well at W10WOMW1 to 2000 gpm**

They assert that their modeling establishes that 4,000 gpm of extraction at the Arrow and Lante wells will "equal the containment component" of EPA's recommended extraction locations (#10 and 13), making EPA's recommended locations unnecessary. (p.4)

<u>EPA Response:</u> See Response B for a discussion of the merits of relying on extraction at Arrow/Lante and the value of extraction at W10WOMW1. A significant disadvantage of moving extraction locations from EPA's recommended locations to Arrow/Lante is that it would permit additional degradation of the portion of the aquifer between EPA's recommended extraction locations and the Arrow/Lante wells.

Because the Record of Decision recommends, but does not prescribe, specific groundwater extraction rates and locations, EPA has not completed a detailed review of the computer modeling or other analyses carried out in support of Aerojet's proposal to replace EPA's recommended extraction rates and locations with 4,000 gpm at the Arrow/Lante cluster. Our own evaluations lead us to expect that extraction in the vicinity of well W10WOMW1 will remove contaminant mass, but will <u>not</u> contribute to EPA's objective of limiting migration of contaminated groundwater out of Subarea 1. If so, then commentor is proposing to substitute 4,000 gpm of extraction at Arrow/Lante in place of the 8,500 gpm that EPA's evaluations indicate is necessary. In their submittal, commentor does not identify what differences in hydraulic conductivity, differences in interpretation of the extent of contamination, or other differences justify their assertion that they can extract approximately 55% less groundwater and still satisfy EPA's migration control objective. Also see response to Aj#122.

Aj#266. In the cover letter (p.3), Aerojet et. al. note that: (i) spreading and recharge conditions resulting in the "wet condition" particle tracking pattern is rarely in place for more than a few months at a time; and (ii) "zigs and zags" in contaminant movement result in the contamination moving "not as fast as a steady state aquifer would predict."

<u>EPA Response</u>: We agree with these two observations.

EPA's modeling efforts account for variability in rainfall and recharge, and the atypical but expected occurrence of wet and dry conditions, by using actual recharge volumes for each three month period between October 1977 and June 1990 as input values into the CFEST model.

EPA's modeling efforts account for varying regional flow conditions, and "zigs and zags" in contaminant movement, in two ways. First, EPA examined regional flow conditions, and the performance of various remedies, at four different times (spring 1983, fall 1986, spring 1987 and fall 1989). These four times correspond to one period of above average rainfall and spreading, two average periods, and one dry period. See Figure 7-8 and accompanying text for the results. Second, EPA used *particle tracking* to examine the cumulative effects of alternating periods of lower than average, average, and higher than average rainfall and recharge. Zigs and zags are apparent in Figures 7-9 and 12-2. As discussed in the FS, EPA uses a *transient* rather than *steady state* model to account for variability in flow rates and directions over time.

In contrast, Aerojet et. al. attempted to account for variable rainfall and recharge by completing three different simulations, but apparently repeating the same rainfall/recharge assumptions year after year in each of the three simulations. Aerojet's "dry condition" simulation (Drawings 1 and 4) appears to assume steady-state drought conditions every year for 14 consecutive years. Aerojet's "wet condition" simulation (Drawings 3 and 6) appears to assume extremely high rainfall conditions every year for 14 consecutive years. We believe that this methodology is unrealistic and inappropriate since we do not expect a 14 year drought or 14 consecutive years of the extreme rainfall. Designing a clean up project to perform in such conditions could result in a significantly over- or under-designed project.

Aerojet et. al. also present the results of a *transient* computer simulation which more realistically assumes varying recharge/rainfall conditions over a 14 year period, but the figure summarizing the results is extremely difficult to interpret (Drawing 7). It appears to contradict EPA's results, and Aerojet's own steady state results presented in Drawings 4-6, in showing an average northwest to southeast direction of flow. It also appears to show particle tracks making an abrupt right turn on their way toward the Arrow/Lante wells. This behavior is inconsistent with known hydrogeologic features of the area.

Aj#267. In their cover letter (p.3), Aerojet et. al. claim that "all extraction systems will pull [groundwater] almost directly from the Santa Fe Spreading Grounds."

<u>EPA Response</u>: We believe that this conclusion is incorrect and probably results from Aerojet's unrealistic recharge assumption

in which they assume extremely high rainfall conditions every year for 14 consecutive years. See response to previous comment.

We also note that elsewhere in their submittal, Aerojet et. al. appear to contradict this comment in asserting that their proposal, in contrast to EPA's recommended extraction rates and locations, "does provide hydraulic containment north of the 210 Foothill Freeway [when simulated for wet conditions] ... (p.5)"

Aj#268. In the cover letter (p.3), Aerojet et. al. also assert that during average or dry conditions the Arrow/Lante wells will recapture contaminated groundwater that may have passed the wells during wetter periods.

EPA Response: As noted in the response to the comment Aj#265, EPA's modeling indicates that approximately 8,500 gpm of extraction, not 4,000 gpm, is needed to limit migration out of Subarea 1 during all recharge conditions. We therefore doubt that extraction of 4,000 gpm of contaminated groundwater at the Arrow/Lante wells could satisfy EPA's migration control objective during wet or average conditions, or recapture during average or dry conditions contaminated groundwater that may have passed the wells during wet conditions.

Aj#269. Aerojet/ALR/OSCO claim that EPA's recommended extraction well locations would "unnecessarily increase the draw of water from the northeast, pulling both VOC and nitrate contamination from north of the I-210."

EPA Response: We disagree; EPA's computer simulations show that EPA's recommended extraction rates and locations are at or near the minimum needed to contain groundwater contamination in Subarea 1. We have not reviewed Aerojet/ALR/OSCO's modeling assumptions, but their conclusion that EPA's extraction rates are unnecessarily high probably results from unrealistic modeling assumptions. One unrealistic assumption, reflected in unrealistic flow patterns in Aerojet/ALR/OSCO Drawings 1-6, is described in response to comment Aj#266. EPA's modeling results are presented in Figures 7-8 and 7-9.

Aj#270. Aerojet/ALR/OSCO also repeat many of the assertions made in other submittals: "that EPA's analyses have not been sufficiently detailed to identify...local-scale disturbances"; that EPA did not consider the hydraulic impacts of pumping at the Arrow/Lante wells; "EPA's proposed remedy is not effective or technically defensible."

EPA Response: EPA did consider extraction at the Arrow/Lante wells and believes that its analyses are adequate to support the selection of remedy. See Response B for a discussion of the merits of relying on extraction at Arrow/Lante and the value of extraction at W10WOMW1. See Response F for a rebuttal to the assertion that data collection or analyses are inadequate to support the selection of remedy.

AJ#271. Aerojet/ALR/OSCO repeat their comment that EPA must adequately characterize the hydrology and hydrogeology of the aquifer system and basin operations before issuance of a ROD for the Baldwin Park OU. Alternatively, they recommend that EPA incorporate "a considerable element of flexibility" in the ROD. "The precise locations of wells and rates of groundwater extraction can be adequately identified only after the interpretation of comprehensive groundwater monitoring data."

EPA Response: As described in detail in Response F, EPA disagrees with the assertion that additional data collection is necessary before remedy selection.

We agree, however, that additional data collection is needed to select precise extraction rates and locations.

XVIII. Comments by Azusa Land Reclamation

ALR#1. ALR jointly submitted comments on the Feasibility Study and Proposed Plan with Aerojet General Corporation and "endorses and includes by reference" comments submitted by the San Gabriel Basin Industry Coalition.

EPA Response: See EPA responses to comments by Aerojet General Corporation and the San Gabriel Basin Industry Coalition.

ALR#2. Commentor expresses belief "that any interim remedy ... will be on a scale that is designed solely to achieve effective containment (while hopefully maximizing mass removal)."

EPA Response: As explained in Response B, "containment" is one, but not the sole remedial objective for the Baldwin Park area.

ALR#3. Commentor states that "...[other than approximate extraction locations and rates], virtually everything else about the project is left indefinite... The relatively undefined state of the Proposed Plan precludes the level of public participation in remedy development intended by CERCLA and the NCP by leaving much of the design detail, including the important issue of treated water disposition, to post-ROD and post comment refinement."

EPA Response: Commentor asserts that a lack of detail in EPA's proposal limits public participation but identifies only one project detail missing from the Plan: the disposition of the treated water. EPA did meet several times with potential recipients of treated water, obtained specifications of purveyor distribution systems, and completed detailed analyses of the cost and feasibility of supplying water to potential recipients. In the Feasibility Study and Proposed Plan, EPA presents the results of its investigations: a list of potential recipients; flow rates, pressures, and locations at which potential recipients could accept treated water; and a discussion of the advantages and disadvantages of supplying treated water to each potential recipient. See pages 9-15 to 9-23, Appendix D, and pages 7-8 of the Proposed Plan. EPA chose not to specify a single recipient to allow the public to comment on EPA's distribution options (the disposition of the treated water has been an issue of significant local concern) and also because of uncertainty about some project details that affect the relative cost or feasibility of transporting water to potential recipients. Nor did it appear realistic to expect potential recipients to commit to accepting treated water until EPA was in a position to make a reciprocal commitment.

We believe that the appropriate time to reach agreements on the disposition of the treated water will be in the months after the Record of Decision is signed. EPA expects to continue, and perhaps complete, discussions with potential recipients of the treated water in the next several months. We note that numerous comments were received during the public comment period expressing a preference to supply treated water to the Metropolitan Water District of Southern California.

Lastly, we note that the commentor laments that EPA has left "much of the design detail" until after the ROD. In fact, the NCP calls for "design" to follow remedy selection; the usual sequence is: remedial investigation => feasibility study => remedy selection => design => construction. It would be wasteful and inefficient to complete "design-level" studies pre-ROD that are likely to be duplicated post-ROD. We have followed this logic in the development of our proposed remedial action for the Baldwin Park area.

ALR#4. Commentor points out that the remedy is complicated by "the elaborate web of interrelated agencies that administer its water supply and water quality objectives," the use of the aquifer for drinking water supply and storage, and significant pumpage and recharge.

EPA Response: We agree. In its Baldwin Park Feasibility Study, EPA considered and incorporated the effects of pumping and recharge into the development and evaluation of remedial alternatives. EPA has also consulted extensively with local agencies with water supply or water management responsibilities during the development of its Proposed Plan.

ALR#5. Commentor argues that EPA should complete a characterization study in Subarea 3 to determine whether remedial action is warranted.

EPA Response: We disagree. See Response A, which explains in detail the basis for EPA's conclusion that remedial action is warranted in Subareas 1 and 3.

ALR#6. Commentor asserts that "...significant legal issues would be presented by any attempt to move forward at this time based on the current administrative record. Specifically: (1) the NCP precludes remedial action, even interim action, based on inadequate data or, as in the case of Subarea 3, an almost total absence of characterization information; and (2) the NCP requirement that the remedial response selected be cost-effective would not be satisfied." Commentor continues: "...even if circumstances where EPA's "bias for action" policy is triggered, a condition that does not exist here, the NCP makes clear that remedial action should not be taken until "site data" and information make it possible to do so," (40 CFR 300.430(a)(1)) and only when "information is sufficient to support remedy selection (Preamble, 55 FR 8704)". Commentor also cites other text from the NCP which calls for "a base level of qualitative risk information" even at early or interim actions, and the need for EPA to demonstrate that an "action is necessary to stabilize the site, prevent further degradation, or achieve significant risk reduction quickly." (55 FR 8704-8705)

Lastly, commentor cites NCP requirements and court decisions that remedy selection be cost-effective (p. 4-5).

EPA Response: Commentor does not identify any specific data deficiencies in this comment. As discussed in Response F and elsewhere in this Responsiveness Summary, EPA believes that its data collection and analysis efforts are adequate to support the selection of a remedy for the Baldwin Park OU and that other requirements of the NCP cited in the comment have been satisfied.

ALR#7. Commentor recommends the modified extraction configuration described in the "Proposal for Technical Modifications Optimization of U.S.EPA Region IX Subarea 1 Proposed Project, Baldwin Park Operable Unit" and asserts that this modification makes EPA's recommended extraction locations in Subarea 1 cost-ineffective. Commentor also notes that if the "plume equilibrium" hypothesis advanced by the Coalition is confirmed, EPA's recommended remedy for Subarea 3 would be costs-ineffective.

EPA Response: We disagree with commentor's claim that the referenced report establishes that any portion of EPA's proposal is cost-ineffective. See response to comment Aj#256, Response B for EPA's response to the referenced report, and Response A on the "plume equilibrium" hypothesis.

XIX. Comments by Azusa Pipe & Tube Bending Corporation

APTB#1. Commentor describes his business's weak financial status, including his difficulty borrowing money; expresses amazement that solvents could have reached the subsurface at his Azusa facility; expresses optimism that the business will be able to complete remedial investigation work requested by the Regional Board; expresses concern over "the specter of additional costs of undetermined amount"; and finally, finds it disconcerting and unfair that "we find ourselves on a PRP list."

EPA Response: Comments noted. We do not know of the PRP list to which the commentor refers. Commentor has been directed to investigate the extent of contamination at his Azusa facility by the Regional Board, but Azusa Pipe & Tube Bending Corporation has not, to date, received General or Special Notice of Liability for contamination at the San Gabriel Valley Superfund sites.

XX. Comments by Chemical Waste Management, Inc.

CWM#1. Commentor describes potential advantages of air sparging combined with soil vapor extraction (AS/SVE), in relation to EPA's proposed technology (groundwater extraction, above-ground treatment, and distribution of treated water). Recommends that EPA further investigate AS/SVE.

EPA Response: See Response E.

XXI. Comments by John R. Glass and Associates

1. Commentor, a real estate broker, describes a recently purchased parcel of land in a planned industrial park in Irwindale, CA, which appears to be in the "upper area" described in EPA's Proposed Plan. Commentor asks how he can help the cleanup, and protect himself, the owner, and any future tenants of the Irwindale parcel from liability for the costs of EPA's proposed clean up.

EPA Response: An EPA representative contacted the commentor by telephone to explain CERCLA's liability provisions and to discuss his concerns about the parcel.

XXII. Comments by Greene Company

Gr#1. "I'm glad to see that we are on the way to cleaning up the ground water, however, it seems that we are following that famous saying, we have the cart before the horse!"

EPA Response: Comment noted.

Gr#2. "It's my understanding that it is illegal to dump toxic material (substances) on/in the ground, in the sewer or basically anywhere? Please just a yes or no answer."

EPA Response: A simple yes or no answer would be misleading. The wisdom and legality of dumping potentially toxic materials depends on the material's constituents, its properties, the amount disposed, and the method of disposal.

Gr#3. "Does your agency or any other agency you know of have a count on the amount of toxic drain cleaner that is dumped each year?"

EPA Response: No, although we note that if used as intended, all household drain cleaner would end up in the sanitary sewer.

Gr#4. "...why is it illegal to dump toxic material such as drain cleaners but it's ok to make them?"

EPA Response: Many commonly-used materials such as drain cleaner, bleach, glues, and gasoline are toxic if ingested or inhaled in sufficiently large quantities, but are considered safe if properly used and disposed of.

Gr#5. Are the contaminants found in the groundwater the same ingredients found in toxic drain cleaners?

EPA Response: An EPA representative contacted the commentor to clarify the comment. Commentor explained that he is concerned that common household drain cleaners such as "Drano" or "Liquid Plummer" may be contributing to the groundwater contamination. EPA is not aware of any common drain cleaners that contain the chlorinated solvents or other contaminants found in the groundwater.

XXIII. Comments by the San Gabriel Basin Industry Coalition (IC)

Responses 1 through 7 address general comments made by the Industry Coalition (the Coalition) on pages 1-7 of their submittal that are not duplicated in the specific comments presented on pages 7-10. Responses 8 through 29 address the specific comments.

IC#1. Commentor writes that "input files [supplied to the Coalition by EPA] for many of the monitoring and water supply production wells lacked data on wellhead and/or screened interval elevations." (p.1)

EPA Response: EPA has supplied the Coalition with all requested data in its possession, including elevation data. We note that construction data for monitoring wells that are not in EPA's electronic database are available in paper reports from EPA or the Regional Board. We also note that EPA has not obtained construction data for some from old, inactive production wells.

IC#2. Commentor writes that "discussions with EPA representatives have confirmed that data gaps with respect to geographic location and completion intervals for some water supply wells continue to exist in the Basin," that data on locations/completion intervals typically require a year or more to be entered into EPA's electronic database, and that "these gaps and delays in updating the data have hampered modeling efforts." (p.2)

EPA Response: See response to IC#1. We also note that there were delays in supplying data to the Coalition but that much of the delay resulted from the Coalition's difficulties in identifying which data they sought. These difficulties appeared to result in large part from the Coalition's initial insistence on communicating with EPA only through their legal representatives who were not familiar with the types or uses of the data and could not clearly communicate their needs to EPA staff.

IC#3. In its explanation of its decision to develop a "parallel simulation capability" using its DYNSYSTEM computer code, the Coalition asserts that EPA's CFEST computer code is "not suitable for contaminant transport replication or prediction..., cannot be used to depict OU specific conditions..., and has less acceptability and credibility as a modeling tool" than the Coalition's preferred computer code (DYNSYSTEM) because it is used less frequently. Commentor also claims that CFEST cannot accurately simulate effects of recharge and pumping, cannot account for "local variability in aquifer hydraulic conditions," criticizes other model assumptions, and finally questions the CFEST model's usefulness. (pp.2-5)

EPA Response: We believe that these criticisms of the CFEST code are for the most part, untrue or misleading. The CFEST code, as calibrated for the Baldwin Park area:

o is a useful and appropriate tool to support the determination of approximate extraction rates and locations;
o is suitable for contaminant transport simulations;
o can be used to depict OU-specific conditions;
o is an equally accepted and credible model (as DYNSYSTEM) if properly developed and used;
o can accurately simulate recharge and pumping;
o can account for variability in hydraulic conditions;
o accurately simulates hydraulic conductivity;
o does not need to account for sorption or degradation to justify the need for remedial action;
o makes reasonable assumptions about vertical discretization, boundary conditions, and the ratio of horizontal to vertical hydraulic conductivity, and other input parameters.

See Response C for a detailed discussion of the role of modeling in EPA's efforts. Also see Response A for a discussion of the feasibility of using computer simulations of contaminant transport in order to predict the rate of contaminant migration in the Baldwin Park area. We doubt its feasibility.

IC#4. Commentor asserts that "current and historical pumpage for water supply purposes have had a profound effect on groundwater conditions and contaminant distribution in the Basin." (p.3)

EPA Response: Commentor does not define "profound" or offer any detailed support for this assertion, but we note, in contrast, that our analyses suggest that pumping in the Baldwin Park area accounts for only a fraction of the increase in the areal extent of contamination. Also see response to comment Aj#54.

IC#5. Commentor makes a variety of arguments that the amount of data in Subarea 3, or the analyses of the data, are insufficient to justify remedy selection. (e.g., see p.4)

EPA Response: We disagree. See Response F for a general response to this comment. See Response A for an explanation of EPA's view that additional data collection and analysis are unlikely to alter the need for remedial action in Subarea 3 or require any changes in the selected remedy.

IC#6. Commentor recommends that the extraction rates and locations be selected to maximize contaminant mass removal. (p.4)

EPA Response: Contaminant mass removal is one, but not the sole, remedial objective which should be used to guide the selection of extraction rates and locations. See Response B for a more detailed explanation of factors to be considered in selecting extraction rates and locations.

IC#7. Commentor mentions (but does not include in its written comments) "very preliminary" and "hypothetical" computer simulations which show a "plume or plumes which demonstrate stability over time and eventually dissipate." The results of the simulations were briefly presented to EPA representatives using a series of slides at a public meeting held May 20, 1993. (p.5)

EPA Response: EPA cannot provide a complete response to this comment since the Coalition does not identify assumptions made in these simulations in its written submittal. We recall, however, from the May 1993 presentation that one of the critical assumptions in the computer simulations was a half-life for TCE of approximately seven years and that this assumption was not supported with any site-specific data. We believe that this assumption is unrealistic, and suspect that it contributes greatly to the stability and dissipation of the plume seen in the computer simulations.

[The following 22 responses are to comments submitted as "Specific Comments on The Baldwin Park OUFS and Proposed Plan," Section 5 of the Coalition's submittal (pp. 7-10).]

IC#8. "The Coalition concurs with EPA's apparent decision to focus the Proposed Plan on a remediation (containment) approach, rather than a large-scale enhanced water supply project. However, although the selected alternative is the least intensive in terms of volume pumped of all of the alternatives considered in the OUFS, the OUFS proposes a significant extraction program at the downgradient end of the contaminant plume(s) without documentation that such action is necessary to meet the stated remedial objectives. The rationale stated on p. 9 of the Proposed Plan for cessation of operations when "contaminant concentrations decrease sufficiently that continued efforts to limit migration of contaminated groundwater are not longer necessary" may apply to Subarea 3 now. Furthermore, the OUFS fails to evaluate and account for the potentially beneficial impact of Subarea 1 pumpage on contaminant migration in Subareas 2 and 3.

Over half of the proposed extraction rate (10,500 gpm of 19,000 gpm total) is from Subarea 3. Modeling/monitoring may demonstrate this is not necessary (especially with pumping from Subarea 1) resulting in a project with considerably lower capital and O&M costs. Complications resulting from distribution of treated water to multiple purveyors would also be reduced.

The alternative of extraction only from Subarea 1 was apparently not evaluated in the FS, although EPA materials distributed at the community meeting on May 20 indicated that "extraction in one, rather than two broad contaminated areas" was considered."

EPA Response: We disagree with the Coalition's comment that EPA has not documented the need for remedial action at the downgradient end of the contaminant plume(s) (the "lower area"). See Response A for a detailed response to this comment, including a response to speculation by the Coalition on the importance of various factors in resisting contaminant migration (sorption, recharge-induced dilution, degradation, contaminant removal through pumping, diminished releases to the subsurface). Response A also explains how the Coalition's claim of "plume oscillation and retraction" between 1980 and 1990 results from a misinterpretation of water quality data, and the limited value of the "Subarea 3 Characterization Study" proposed by the Coalition.

We also disagree with the assertion that action in Subarea 1 diminishes the need for action in Subarea 3. Remedial action in Subarea 1 will reduce the long-term influx of contaminants into Subareas 2 and 3, but there is already a substantial area (several square miles) of high-level contamination present downgradient of the proposed Subarea 1 extraction locations that requires remediation. The proposed action in Subarea 1 will not inhibit the continued migration of this existing contamination. In addition, there may be subsurface sources of contamination in Subarea 2 downgradient of the Subarea 1 extraction wells. And, the fact that high-levels of contamination exist now and have persisted in Subarea 2 for decades after improved management practices likely reduced the input of surface sources indicates that substantial residual sources may exist in the vadose zone and aquifer within Subarea 2. Furthermore, the existing contamination is of sufficient extent that, even without any continued additional influx of contaminants from Subarea 1 or other surface or residual sources, contamination will continue to move towards the Subarea 3 extraction wells for many years or even decades.

IC#9. "The OUFS recognizes and states (p. 7-5) that available data do not show any significant change in contaminant levels from just downgradient of Subarea 3 to as far as Whittier Narrows, but unsubstantiated statements regarding groundwater contamination spreading into less contaminated and uncontaminated portions of the aquifer are made at several locations in the text (such as on p. 6-11). On p. 7-38, it is noted that "dispersion, diffusion, or retardation... are likely to cause contaminant levels to decline as contamination migrates downgradient." These critical considerations were not utilized in any manner in the evaluation of potential remedy options."

EPA Response: There is substantial evidence that groundwater contamination is spreading into less contaminated and uncontaminated portions of the aquifer and that the listed contaminant fate and transport processes (dispersion, diffusion, and retardation) cannot stop contaminant migration. See Response A for a detailed response to this comment.

IC#10. "Because the above two comments establish the necessity to collect data to substantiate a need for remedy in Subarea 3, remedy selection and design is not appropriate until such subarea-specific data are collected. Protection of the public health and the environment is currently being provided via active and on-going wellhead treatment and continued monitoring. Hence, there is no

urgency to implementing any further remedy, and such action should be deferred until data are collected which demonstrate that such a need truly exists."

EPA Response: We disagree that the above two comments "establish the necessity" to collect additional data to justify the need for action in Subarea 3. We also see no point in debating the precise level of "urgency." We believe that the data support the selection and implementation of a remedy for the Baldwin Park area and, clearly, the sooner the remedy is implemented the less the contamination will spread into clean or less contaminated areas. See responses to the two previous comments and Response A.

IC#11. "The OUFS provides no substantiation that the downgradient pumpage will not conflict with the remedial objective of inhibiting migration from more highly to less contaminated areas. In fact, this concern is stated on p. 7-26."

EPA Response: We disagree. On page 7-26 of the FS, it is stated that "the continued pumping of existing production wells located outside of the highly contaminated areas can increase migration into less contaminated areas, ... depend[ing] on the location of the existing well in relation to the contamination ..." This statement follows from basic hydraulic principles: that a pumping well lowers the water table in the vicinity of the well and that water flows from higher to lower elevations. The implication of this statement is that extraction should not be located in areas known to be clean or less contaminated than nearby areas. Instead, extraction should be located in areas known to be contaminated at higher concentration than nearby areas. EPA's proposed project is consistent with this principle. Contaminant concentrations at or near proposed extraction locations (Valley County Water District's Big Dalton and Paddy Lane wells) have consistently remained significantly higher than at downgradient wells (e.g., San Gabriel Valley Water Company's B4 wells). The following table summarizes several years of data for peak and average groundwater concentrations for these three wells.

	VCWD Big Dalton well	VCWD Paddy Lane well	SGVWC B4B & B4C wells
TCE - peak ave	130 ug/l 42	85 30	nd nd
PCE - peak ave	5 1	14 4	nd nd
CTC - peak ave	9 5	16 7	4 1

PEAK AND AVERAGE GROUNDWATER CONCENTRATIONS FOR SELECTED WELLS (1980 - 1991 for Big Dalton, Paddy Lane; 8/89 - 1991 for B4B well; 7/88 - 1991 for B4C well).

We recognize that additional sampling planned as the first step in the design of the project may change our understanding of the precise extent of contamination. These additional data will be used to select precise extraction locations that best meet EPA's remedial objectives of limiting contaminant migration and removing contaminant mass.

IC#12. "The OUFS recognizes and states (p. 11-9) that the CFEST model is appropriate and applicable on a regional scale, and not for local-scale use, but accurate prediction/estimation of hydraulic conductivity has still not been made, and there is still too much bias towards tests exhibiting higher values. The OUFS does recognize and state that the hydraulic gradient in the BPOU area is generally the lowest in the Basin (p. 2-13)."

EPA Response: We believe that computer simulations completed by EPA to support its proposed remedy are sufficiently accurate for their intended purpose. See Response C for additional explanation of the role of computer modeling in the development of EPA's proposed remedy. Also see response to comment Aj#1.

IC#13. "The shape and size of the downgradient extent of individual zones of contamination are typically inferred from the estimated directions and magnitude of groundwater flow and are in only a few cases directly constrained by data from wells" (emphasis added)(p.3-10). Considerable uncertainty continues to exist, therefore, regarding the downgradient extent of the plume(s), precluding accurate identification of plume/contaminant migration. As a result, the current FS violates the requirements of the NCP in that the nature and extent of contamination have not been established to the extent necessary to select a remedy."

EPA Response: We agree with a portion of the comment in which commentor emphasizes the uncertainty about the precise extent of downgradient contamination, but disagree that this level of uncertainty precludes the selection of an appropriate remedy or violates the NCP.

The commentor's argument appears to be the same as presented in its "General Comments" and in "Specific Comments" 1, 2, 3, and 4 - that the only reasonable test of the need for remedial action is the demonstration of statistically significant increasing concentration trends. As described in Response A, EPA believes that the preponderance of evidence shows that remedial action is needed to limit migration and remove contamination. We see no significant evidence that the contamination will stop spreading and disappear (i.e., "naturally attenuate") without remedial action.

IC#14. "In some sections, the OUFS likely understates the effects of historical pumpage on contaminant migration (e.g., "a small fraction;" p.

2-19). This contradicts other sections where shifts in the entire location of the plume(s) are attributed to pumpage (p. 3-23). The absence of significant effects is allegedly supported by modeling results, but there is no indication where these results are presented."

EPA Response: We see no contradiction between the two statements. The statement on page 2-19 that "purveyor practices may have caused a small fraction of the increase in the areal extent of contamination..." refers to the entire, multi-square mile lateral extent of contamination. The statement on page 3-23 presents a hypothesis to explain decreases in contaminant concentrations at two water supply wells along the eastern side of the OU area. Reductions in contaminant concentration at these two wells imply a small fractional decrease in the total lateral extent of contamination.

The modeling results referred to on page 2-19 are discussed in section two of the "Draft Basinwide Technical Plan" (EPA, 1990).

IC#15. "Maximum contaminant values and, to a lesser extent average values, are still used for plume delineation purposes. Such delineation should be based on most recent values for a consistent/concurrent period (i.e., not over a 15 month period). Figure 3-1 is clearly not a "snapshot in time." Table 3-2 includes a summary of data over a 12 year period and therefore obscures any contaminant migration or concentration change trends."

EPA Response: We believe that it is appropriate to illustrate the extent of contamination using maximum or average values. In the FS, figures 3-1 to 3-6 illustrate the extent of contamination by combining data collected over the most recent 14 or 15 month period. Despite the Coalition's criticism, the Coalition apparently agrees with our view - a figure included in Appendix E of the Coaltion's submittal (Changes in TCE Concentration With Time) was also drawn by averaging data over a 12 month period. EPA, and presumably the Coalition, believe that figures drawn using data collected over a shorter period of time would provide a less complete, less coherent, picture of conditions in the OU area.

There is no single "right" way to illustrate the extent of contamination; assumptions must be made in order to draw any figure. The "right" way to draw a figure is to make assumptions that are appropriate for the use of the figure.

For example, illustrations of the geographic extent of contamination (e.g., Figures 3-1 to 3-6 in the FS) are best drawn by using data collected over a long enough time period to provide good coverage of the area of interest. On the other hand, illustrations of trends over time are best made by comparing figures each constructed with data collected over a shorter periods of time. We have included three new figures, Figures RS-

9 to 11, drawn to illustrate variations in contaminant concentrations with time.

We agree that the data in Table 3-2 cannot be used to discern contaminant trends. Identification of trends is *not* the purpose of the table (see page 3-5).

IC#16. "The statement that available data do not show large variations in contaminant concentrations with depth (p. 7-6)(1) contradicts Figure 3-9, and (2) ignores the fact that there are insufficient data to allow any significant conclusions regarding the vertical distribution of contaminants beyond a general characterization of vertical extent."

EPA Response: The statement on page 7-6 is that "the available data do not show large enough variations in contaminant concentration with depth to justify selectively extracting from specific depth intervals ..." This statement does not contradict the results of depth-specific sampling, which does show some variation in concentration with depth (summarized and interpreted in figure 3-9). Nor does this statement preclude selective extraction if future water quality data demonstrate much higher levels of contamination in selected depth intervals.

IC#17. "The OUFS states on page 9-4 that the "remedial effects" of recharge of extracted water via spreading are discussed. No such discussion could be found."

EPA Response: Brief (sentence or two) qualitative discussions of the remedial effects of recharge are included in each of subsections 9.1.1, 9.1.2, and 9.1.3 of the FS. Also included in section 11 is a comparison of computer simulations for two scenarios: (i) extraction of 29,000 gpm of contaminated groundwater; and (ii) extraction and recharge of 29,000 gpm, primarily at the Irwindale Spreading Grounds (pages 11-6 to 11-9).

IC#18. "For five individual sites discussed (pp. 3-35 to 3-39) (only two of which are located in or near the BPOU), the occurrence of TCE and daughter compounds is attributed solely to degradation, ignoring potential (perhaps probable) migration from upgradient areas."

EPA Response: Comment noted. Also see response to comment Wyn#18.

IC#19. "The OUFS appropriately recognizes the need for flexibility at this time in terms of end use of extracted water, including both recharge and distribution options, and flexibility for treatment unit size, cost, and configuration. However, the absence of a quantification of costs and impacts associated with the distribution of extracted and treated groundwater, although understandable at this time, precludes this FS from complying with CERCLA guidance or the NCP. Because these costs are likely to be significant when compared to the total for each alternative, the FS presents an incomplete analysis and comparison of the cost effectiveness of the alternatives."

EPA Response: We disagree with the Coalition's comment that the FS does not comply with the NCP or EPA guidance. The FS includes a detailed evaluation of costs and institutional issues associated with several distribution options. We believe that our cost estimates are within the range called for in EPA guidance (no more than 30% above or 50% below the true cost).

IC#20. "The OUFS explicitly fails to acknowledge the impracticability of aquifer restoration (p. 6-10). The "ARAR Waivers" section on p. 4-16 lists the case where "compliance with ARARs is technically impracticable from an engineering perspective" as an ARAR waiver condition. Despite EPA guidance regarding technical impracticability, this is not mentioned elsewhere in the OUFS. EPA's Proposed Plan refers to "complete cleanup of all or portions of the aquifer" (p. 4), despite EPA guidance and numerous ROD precedents regarding the technical impracticability of aquifer restoration at comparable groundwater contamination sites."

EPA Response: The comment is correct that EPA has not acknowledged the impracticability of aquifer restoration. On page 6-10 of the FS it is stated: "The remedial objectives do not include restoration of the aquifer, not because it has been concluded that restoration of all or a portion of the OU area is impracticable, but because the Baldwin Park OU is a first, interim (rather than final) remedial action."

We are aware of research and evaluations of other groundwater contamination sites identifying factors that may prevent complete restoration of all or portions of areas of groundwater contamination. We do not believe it is appropriate to reach any conclusions at this time, however, about the feasibility of restoration of the Baldwin Park area. As stated on page 6-10 of the FS, "Additional data obtained during design and implementation of the remedial action will improve EPA's ability to determine the nature of the final remedy (e.g., to determine whether, or to what degree, restoration is practicable)." EPA's position is consistent with current regulations and guidance.

The Coalition incorrectly asserts that EPA's use of the words "complete cleanup of all or portions of the aquifer" in the Proposed Plan is inconsistent with "EPA guidance and numerous ROD precedents." The words are included as part of the statement that "EPA is proposing this project in order to ... reduce the eventual cost, difficulty, and time required for complete cleanup of all or portions of the aquifer." This statement is consistent with, and in fact advocated by, EPA guidance which calls for interim actions at contaminated groundwater sites to limit expansion of a contaminated area. The Coalition fails to provide any EPA guidance or specific ROD precedents with which the Baldwin Park OU Proposed Plan is inconsistent.

IC#21. "The OUFS recognizes and states (p. 3-29) that significantly less contaminant mass is entering the system than did historically. However, no

attempt is made to evaluate the probable significant effects of both this source reduction and the reduction of contaminant mass by other mechanisms on the overall contaminant mass balance."

EPA Response: On page 3-29 of the FS, EPA mentions the likelihood that the number and magnitude of continuing surface sources of groundwater contamination has decreased with time. As subsequent paragraphs on pages 3-29 and 3-30 discuss, however, there remain significant subsurface sources of contamination. The FS does not state, and we are not aware of any evidence showing, that the rate at which contamination is entering the groundwater (i.e., the "system") has significantly decreased. The commentor merely speculates, without offering any site-specific data, that the rate at which contaminant mass is entering the groundwater has decreased.

EPA and the California Regional Water Quality Control Board have worked with businesses in the Baldwin Park area to complete the minimum amount of investigation work needed to locate releases of hazardous substances, to determine the approximate extent of contamination, and to determine if contamination has reached groundwater. The data that have been generated in these investigations can be used to very roughly estimate the magnitude of contamination in the vadose zone. EPA does not, at present, believe it prudent to spend, or to direct PRPs to spend, hundreds of thousands or millions of dollars on additional investigation work in order to better estimate the magnitude of contamination. Furthermore, the absence of historical site characterization data would probably preclude any identification of long-term trends in the magnitude of sources until data had been collected for a period of years.

The broader issue of whether additional effort put into a mass balance estimate would prove useful in selecting a remedy is discussed in Response A.

IC#22 (submitted as comment 15a) "With regard to the proposed monitoring program, as described in Appendix E. In whatever form it is implemented, the monitoring program must precede remedy selection and design."

EPA Response: We do agree that the monitoring program must be implemented during the time of remedial design, however, we do not agree that the monitoring program must precede remedy selection. See Response F for additional explanation of EPA's belief that adequate information has been collected and is presently available to select a remedy.

IC#23 (submitted as comment 15b) "There is no discussion of the collection of critical data such as soils chemistry (particularly retardation components) and hydraulic parameters."

EPA Response: See response to DTSC comments #5 and 6.

IC#24 (submitted as comment 15c) "The number of new monitoring wells is excessive for the purposes of remedial design."

EPA Response: We do not agree that the number of wells proposed in the FS is excessive for the purposes of remedial design. In response to other comments, EPA has increased the number of wells in its recommended monitoring program. See response to comment Aj#58, Table RS-3, and Figure RS-3.

It should be noted that not all of the monitoring wells presently included in the monitoring program are exclusively intended for remedial design. Some are intended for monitoring remedial effectiveness, as listed in Table RS-3.

IC#25 (submitted as comment 15d) "[The] rationale for selection of monitor well locations, as presented in Table E-2, is not adequate to provide an understanding or both the primary and secondary basis for each well."

EPA Response: See Table RS-3 for a revised version of Table E-2, which provides additional detail on the intended purpose of each recommended new monitoring well cluster.

IC#26. (submitted as comment 16) "Although risks are calculated in Section 5, these numbers do not appear to be directly used to justify the need for remediation or to set cleanup goals. Calculated risks are within the range of acceptable risk using CERCLA guidance. The risk assessment failed to evaluate the quantified risk of leaving contaminants in place in the aquifer. At other CERCLA' sites, natural attenuation has been accepted as a component of the remedy and shown to result in acceptable risk. The purpose of the risk assessment, therefore, is unclear."

EPA Response: The purpose of the baseline risk assessment completed for the Baldwin Park OU is the same as for risk assessments completed for numerous other Superfund sites - to determine the need for remedial action by evaluating the potential threat to human health and the environment in the absence of any remedial action. In keeping with EPA guidance, it is assumed in the risk assessment that contaminants are left in place in the aquifer and that the contaminated groundwater is served to consumers.

As described on pages 5-18 to 5-22 of the FS and pages 4-5 of the Proposed Plan, the risk assessment included in the Baldwin Park OUFS examines three measures of risk: cancer risk, non-cancer effects, and groundwater concentrations in relation to drinking water standards (EPA and State maximum contaminant levels, known as MCLs). The magnitude of the estimated non-cancer effects and cancer risk are in the range in which EPA uses discretion in deciding whether to take action, but the magnitude of the groundwater concentrations (both mean and upper 95th percentile concentrations) are sufficiently high in relation to drinking water standards (MCLs) to warrant action. EPA guidance states that "action generally is warranted" if MCLs are exceeded even if the estimated cancer risk is less than 10^{-4} and the non-cancer hazard quotient is less than 1 (OSWER guidance 9355.0-30).

Because EPA's proposed project is an "interim," rather than final remedy, EPA is not, at this time, proposing any final clean up goals for the Baldwin Park area.

EPA agrees that "natural attenuation" (i.e., allowing nature to take its course in place of any active remedial action) may be an appropriate approach for meeting limited objectives at some hazardous waste sites, particularly sites with more readily degraded contaminants, but not at the Baldwin Park OU. EPA's reasoning is described in Response A.

IC#27. (submitted as comment 17) "The comment in Table 6-2 that wellhead treatment is not applicable since "existing downgradient wells are not optimally located for migration control" may not be relevant if pumping from Subarea 3 is determined not to be necessary."

EPA Response: Comment noted. As described in Response A, we do believe that pumping in Subarea 3 is needed, to limit further migration of the groundwater contamination and to remove contaminant mass.

IC#28.(submitted as comment 18) "Despite the potential cost and aesthetic advantages of a two-stage air stripper process (p.8-41 to p.8-42) this configuration was not evaluated. We believe that it should be."

EPA Response: We agree that a two-stage air stripper may have cost and aesthetic advantages, as described in the FS on pages 8-41 and 8-42. The Proposed Plan and ROD allow the use of a two-stage air stripper, or other variations on single stage packed tower air stripping if shown to be equally effective, equally implementable, and less costly. We did not carry out a detailed cost comparison of one- versus two-stage air strippers because we believe that such a comparison is more appropriately completed during remedial design, making use of up-to-date water quality data. A detailed evaluation completed now would most likely be revised and superseded as final decisions are made on treatment facility configuration (e.g., to what extent groundwater from multiple extraction locations are treated at one or more centralized locations) and as additional water quality data become available.

IC#29. (submitted as comment 19) "The use of PVC pipe is assumed for pipes 18" diameter and smaller. This construction material may not be appropriate for conveying untreated water with high VOC concentrations."

EPA Response: The estimated average and peak influent concentrations of VOCs are not expected to exceed 600 and 2,000 µg/l, respectively. These concentrations are not expected to degrade the PVC pipe. However, additional evaluation can be performed during remedial design to verify this assumption. The type of material assumed for these smaller diameter pipes does significantly impact the total costs estimated for the remedial alternatives.

XXIV. Comments by the San Gabriel Valley Economic Council

EC#1. Commentor "believes that there is enough technical data to justify the removal of VOC's from groundwater in the Baldwin Park, Irwindale and Azusa area, ... [and] that any groundwater cleanup plan must have measurable results and be the most cost effective.

EPA Response: Comment noted.

EC#2. "Considering the number of current PRP's and possible number of SNL's [i.e., the ultimate number of PRPs - recipients of "Special Notice" letters], ... it is not economically feasible for [EPA's proposed project] to commence."

EPA Response: EPA assumes that the comment refers to the ability of PRPs to pay for EPA's proposed project. EPA has not completed its evaluations of the ability of businesses currently under investigation to fund EPA's proposed project, nor are we aware of any independent evaluations of PRP's ability (or inability) to pay. EPA will, however, complete its evaluations before formally asking PRPs to fund the selected remedy.

EC#3. "Review and negotiate the $17 million San Gabriel Basin Watermaster Cleanup Plan [before any cleanup projects commence]."

EPA Response: In comments on EPA's Proposed Plan, the Main San Gabriel Basin Watermaster "generally concur[s]" with EPA's Proposed Plan and notes that a portion of the Watermaster Technical Plan for Basin Ground-Water Cleanup closely resembles EPA's Proposed Plan (see Watermaster comments elsewhere in this Responsiveness Summary). EPA therefore sees no value in delaying action to allow for further review or discussion of the Watermaster Plan.

EC#4. "Allow time for the Congressman Esteban Torres "Demonstration Project" bill to be heard [before any cleanup projects commence]."

EPA Response: Neither the Congressman nor his staff, in the bill or in discussions of the bill, have recommended that EPA delay currently planned projects such as proposed in the Baldwin Park Proposed Plan. EPA sees no reasons to delay the selection or implementation of remedy indefinitely while debate continues on Congressman Torres' bill, nor does commentor offer any specific reasons.

It should be noted that Congressman Torres' bill, H.R. 2853, calls for remedial action "in the vicinity of Baldwin Park," as does EPA's Proposed Plan.

EC#5. "Allow time for the development and administration of a guaranteed low interest loan program to assist qualified businesses with hazardous waste investigation and remediation [before any cleanup projects commence]."

EPA Response: EPA is willing to work with businesses to the extent allowed by law to assist them in meeting their investigation and clean up responsibilities. Commentor does not mention any specific financing plans that would warrant delays in the selection or implementation of remedial action in the Baldwin Park area.

EC#6. "Allow time for PRP's and SNL's to formally organize to achieve necessary negotiations with USEPA and to agree on allocation methodology [before any cleanup projects commence]. Develop a more cooperative, less confrontational, relationship between the USEPA and the PRP organization and the PRP's themselves as part of this organization process."

EPA Response: EPA began to notify parties that they may be PRPs for the Baldwin Park Operable Unit in 1990 through the issuance of General Notice of Liability. EPA notified additional parties of potential liability in August 1993.

EPA believes that it has made special efforts to work cooperatively with PRPs. EPA invited PRPs to a series of technical meetings to discuss potential remedies, has engaged in continued dialogue with PRPs and their representatives, and has encouraged the use of the services of a neutral third party to help allocate responsibility. In recent General Notice of Liability letters, EPA offered to supply facility-specific information relevant to allocating responsibility; offered to provide a list of experienced third-party mediators; and offered to help arrange for a mediator. EPA has also expressed a willingness to consider funding a portion of a mediator's cost.

XXV. Comments by Trail Chemical Corporation

Tr#1. Commentor thanks EPA staff for appearing at the May 20th public meeting; requests additional visits and presentations by EPA representatives to improve community understanding of the proposed project.

EPA Response: EPA staff periodically travel the San Gabriel Valley to meet with representatives of local agencies, business groups, and other interest groups. Please feel free to contact EPA at the addresses or phone numbers listed on the Proposed Plan fact sheet if you have questions or would like EPA representatives to meet with an interested group.

Tr#2. Commentor wonders whether EPA's proposed project is "inordinately small" ... [in a non-technical sense] "like two lonely straws in a big pool," but also believes that estimated cost of proposed project is "staggering."

EPA Response: We suggest that the proposal be viewed as five (or so) strategically-placed super straws whose presence will lessen the need for a larger extended family of straws. EPA's rationale for the proposed extraction scheme is described in detail in section 7 and in Response B.

Tr#3. Commentor asks what studies have been completed by EPA of the economic impact of the project on the community; asks whether EPA has determined that PRPs have the ability to pay; and asks whether there are "environmental justice" issues concerning minority business owners and employees.

EPA Response: EPA has completed evaluations of the ability of many of the businesses currently under investigation to fund EPA's proposed project. EPA has not, however, completed any evaluations of the cumulative impact of the project, positive or negative, on the community. You may wish to contact the Regional Water Quality Control Board; we understand that the Regional Board has completed a survey of the economic impact of its investigation and clean up requirements on local businesses.

We are not aware of environmental justice issues raised by our proposal.

Tr#4. "Is EPA willing to consider an "intercept and remove" technique at individual wells, treating the water prior to distribution, rather than a large investment in a treatment plant?"

EPA Response: EPA's plan can be viewed as an "intercept and remove" technique in that it calls for limiting the migration (i.e., interception) and removing contaminated groundwater from two broad areas. A large investment in treatment plants is inevitable as the contamination continues to spread, whether or not EPA's proposal is implemented.

Tr#5. Commentor asks if "a team of community representatives [can] visit a Treatment Plant of the type being proposed" and for details on the plants location, type, costs, and effectiveness.

EPA Response: EPA can supply technical data on the performance of VOC treatment systems installed in various locations in the United States, but it may be of more interest to you to visit treatment systems installed in your community. We suggest that you contact the San Gabriel Basin Water Quality Authority, the Valley County Water District in Baldwin Park, the La Puente Valley County Water District in La Puente, or the San Gabriel Valley Water Company in El Monte. All of these utilities and agencies have constructed or operated VOC treatment facilities in the Baldwin Park area.

XXVI. Comments by Wynn Oil

Wyn#1. Wynn Oil "joins in the comments made by the San Gabriel Basin Industry Coalition, and hereby requests EPA to consider the comments submitted by the Coalition to be submitted also by Wynn Oil."

EPA Response: Comment noted.

Wyn#2. Wynn Oil objects to the inclusion of and conclusions of Section 3.4.4 of the FS. Wynn Oil particularly objects to Section 3.4..4.1, which briefly describes selected data from soil and groundwater sampling at the Wynn Oil facility and in Azusa, California and discusses the likelihood that some of the contaminants observed in groundwater are degradation products.

Specifically, Wynn Oil states:

> **1) "it is wrong to select five out of sixty isolated site investigations for discussion in the Report";**
>
> **2) "the discussion presented concerning the Wynn Oil site fails to take all available data into account and presents a simplistic, speculative and misleading rationalization of the data discussed";**
>
> **3) "the discussion in Section 3.4.4.1 either should be deleted from the Report or limited to a factual presentation of the groundwater quality data from the Wynn Oil monitoring well and the potential sources identified by LARWQCB supervised site investigations in the vicinity of the well."**

EPA Response: We agree that Section 3.4.4.1 should have provided and discussed a third hypothesis: that the contaminants observed in the Wynn Oil monitoring well may have originated offsite. The text evaluates only two hypotheses: that the contaminants observed in the Wynn Oil monitoring well were introduced directly into the subsurface at the Wynn Oil facility, or are degradation products of contaminants introduced into the subsurface at the facility.

We also agree that the evaluations included in Section 3.4.4 are simplistic and that some of the "conclusions" are speculative. The evaluations discuss possible sources of contaminants observed in groundwater using phrases such as "may account for," "could have been present," or "the most likely explanation...is" to indicate the speculative nature of the discussion.

Also, we should have included a statement that Section 3.4.4 does not imply any conclusions about the liability of any parties for the groundwater contamination. EPA believes that it is in position to reach conclusions regarding the sources of the groundwater contamination in the Baldwin Park area, but that was not the intent of Section 3.4.4.

We do not, however, believe that it is inappropriate or "wrong" to discuss the five site investigations without discussing all of the site investigations underway in the Baldwin Park area or in the San Gabriel Valley. The purpose of the discussion in Section 3.4.4 is to briefly examine whether biological degradation of VOCs may be occurring in the OU area; not to identify responsible parties. To accomplish this task, we selected facilities where deep vadose zone and groundwater investigation work had been completed and where the investigation had verified the presence of potential degradation products (dichloroethane, dichloroethene, or vinyl chloride). We knew of only two facilities in the OU area which met these criteria (as of mid 1992); we added three other facilities in the San Gabriel Basin to provide a more representative evaluation.

XXVII. Oral Comments Presented During the EPA-Sponsored Public Meeting on May 20, 1993

[Many of the oral comments duplicate written comments provided by the same individuals or organizations.]

Oral Comments by Jeanne-Marie Bruno, Metropolitan Water District of Southern California

Oral#1. Commentor listed potential benefits of a "conjunctive use operation" and expressed disappointment that EPA did not propose conjunctive use in the Proposed Plan.

EPA Response: See Response D.

Oral#2. Ms. Bruno "questions EPA's treatment and technology selection of air stripping and vapor phase GAC..."

EPA Response: EPA has not proposed or selected air stripping and vapor phase GAC as the only acceptable technology. The Proposed Plan and Record of Decision allow the use of air stripping *and/or* liquid phase carbon. EPA expects to make a final decision on treatment technology during remedial design.

Oral#3. Ms. Bruno listed "significant commitments" to a conjunctive use project in the San Gabriel Basin: near-completion of a comprehensive feasibility study; plans to release a Notice of Preparation for an Environmental Impact Report in June 1993; bench-scale testing on VOCs, nitrate, and arsenic removal; negotiations for an agreement with the Watermaster for storage, extraction, and treatment of water from the Basin; and the active pursuit of Federal funding.

EPA Response: Comments noted.

Oral Comments by Greg McClintock, San Gabriel Basin Industry Coalition

Oral#4. Mr. McClintock expressed agreement with EPA's proposal for groundwater extraction and treatment in the "upper area.: but expressed serious reservations about EPA's proposed action in the "lower area."

EPA Response: See Response A for a detailed explanation of the rationale for action in the lower area.

Oral Comments by Carol Montano, East Valleys Organization (EVO)

Oral#5. Ms. Montano expressed frustration with the length of time it has taken to develop the Proposed Plan for the Baldwin Park area but expresses full support for the Plan. Commentor also expresses support for federal legislation sponsored by Esteban Torres and hope that EPA and PRPs will reach agreement to fund the Plan.

EPA Response: Comments noted.

Oral Comments by Rufus Young, Attorney, Burke, Williams and Sorensen

Oral#6. Mr. Young noted his involvement in the case of United States vs. Montrose Chemical, and in litigation connected with the Operating Industries Superfund Site. Commentor expresses concern that local cities may be dragged into Superfund litigation and asks that EPA work with local governments to prevent the costs of Superfund cleanup from being passed on to local taxpayers.

EPA Response: Comments noted.

Oral Comments by Royall Brown, speaking as an individual

Oral#7. Commentor presented EPA with a list of water supply wells and water quality results and described variations in water quality among the listed wells. Commentor noted that some wells south of the freeway show contaminant levels similar to the Lante well, and concludes that EPA's operable unit should address contamination at wells south of the freeway, as far south as Valley Blvd.

EPA Response: This comment duplicates a written comment provided by Rayall Brown (presumed to be Royall Brown). See response to RB#2 and Response B.

Oral#8. Commentor criticizes the Proposed Plan for failing to address contamination in the El Monte area.

EPA Response: Commentor is correct that the Proposed Plan for the Baldwin Park area does not address contamination in the El Monte area. Due to the large extent of groundwater contamination in San Gabriel Basin, EPA must prioritize its efforts. Remedial action in the Baldwin Park area is EPA's current priority. EPA's second and third priorities are to address the contamination in the Puente Valley and El Monte areas respectively. EPA recently reached an agreement with local businesses which calls for the businesses to complete a remedial investigation and feasibility study in the Puente Valley. EPA is also developing a plan for a remedial investigation and feasibility study in the El Monte area. The Baldwin Park Proposed Plan further describes the status of EPA projects in each area of the Basin.

Oral#9. Commentor believes that EPA's "containment" objective is "warmed over" and "all wrong." Commentor does not believe that any of the remedial alternatives evaluated in the Feasibility Study achieve real cleanup. Commentor believes that EPA should emphasize "total pore tonnage of the contaminants" and revise its plan to achieve "real cleanup."

EPA Response: We disagree that EPA's emphasis on "containment" (i.e., migration control) will result in a meek or inappropriate remedial response. EPA's remedy will limit the spread of the contamination and remove a significant amount (whether measured in pounds, kilograms or tons) of contaminant mass. See Response B for additional explanation of the rationale for EPA's recommended extraction rates and locations.

Oral#10. Commentor requested that EPA place additional paper copies of the Feasibility Study at public libraries. Commentor also requested that copies of the Responsiveness Summary be provided to all parties offering comments.

EPA Response: After the public meeting, EPA placed an additional paper copy of the Feasibility Study in the West Covina Public Library to supplement the paper copies previously provided to the Upper San Gabriel Valley Municipal Water District in El Monte and the San Gabriel Valley Municipal Water District in Azusa. The water district offices are open to the public. EPA staff did speak with a representative of the Baldwin Park library to determine their interest in making a copy of the Study available. The library representative expressed no interest in receiving a copy and was not sent one. Also see response to comment RB#1.

EPA will provide copies of all or part of the Responsiveness Summary to all parties requesting a copy.

Oral Comments by Mary Johnson, speaking as an individual

Oral#11. Ms. Johnson expressed support for EPA's proposal, noting that EPA has clearly explained the reasoning behind its Proposed Plan. Ms. Johnson expressed hope that the review and approval process would continue, to allow the community to evaluate and support wise water quality decisions and actions.

EPA Response: Comments noted.

Oral Comments by Larry La Combe, Sierra Club National Water Resources Committee

Oral#12. Mr. LaCombe expressed concern over the difference in estimated costs between EPA's proposed remedy ($47 million in capital costs) and for a "conjunctive use" project proposed by Metropolitan Water District ($100 million in capital costs). Mr. La Combe also expressed support for conjunctive use and concern about who will finance the clean up.

EPA Response: EPA believes that $47 million is an accurate feasibility study-level estimate for the capital cost of its proposed remedy. EPA's goal in a Superfund feasibility study is for the true cost to be no more than 50% above or 30% below the estimated cost.

EPA staff have not reviewed Metropolitan's cost estimate, but understand that it assumes additional treatment and distribution facilities not necessary for cleanup.

Oral Comments by Bill Robinson, speaking as an individual

Oral#13. Mr. Robinson expressed his view that the EPA approach is "best for local hot spots," but that conjunctive use is superior due to is "water conservation, water supply, and also water cleanup elements."

EPA Response: This comment duplicates written comments provided by Mr. Robinson and others. See response to BR#1-7 and Response D.

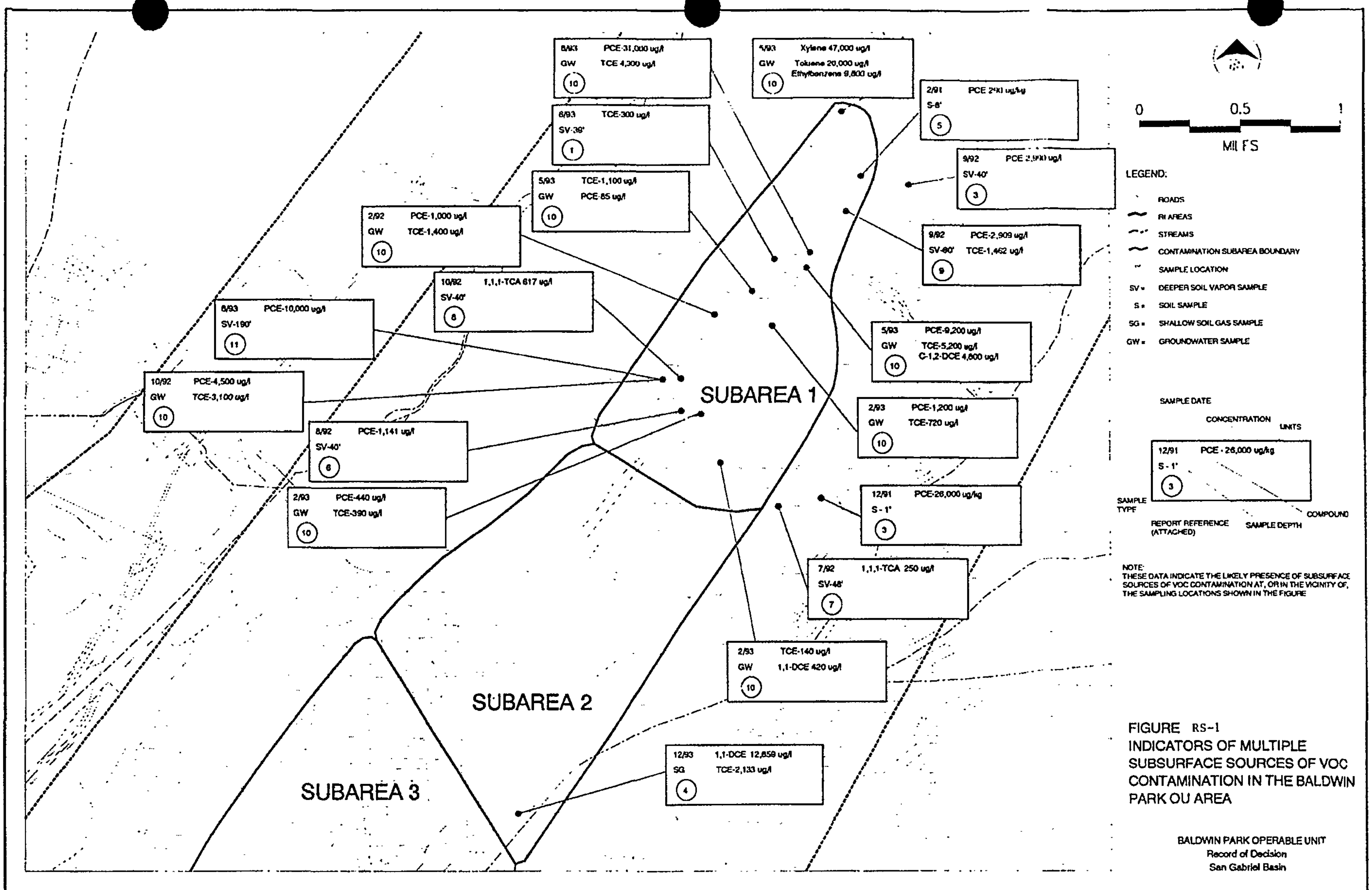


FIGURE RS-1
INDICATORS OF MULTIPLE SUBSURFACE SOURCES OF VOC CONTAMINATION IN THE BALDWIN PARK OU AREA

BALDWIN PARK OPERABLE UNIT
Record of Decision
San Gabriel Basin

Information Sources for Figure RS-1

1) *Initial Results of Shallow Zone Soil Matrix and Vapor Monitoring Well Sampling.* Azusa/Irwindale Study Area, San Gabriel Valley. November 19, 1993. (submitted by Aerojet)

2) *Site Assessment Report for Companion Soil Sampling and Installation and Sampling of Nested Soil Gas Probes.* Former Hartwell Corporation Site, 701 West Foothill Boulevard, Azusa, California. November 9, 1992.

3) *Report for Contaminated Soil Excavation and Removal.* California Portland Cement, Azusa Facility. April 1992.

4) *Supplemental A Soil Gas Survey.* Conducted at Davidson Optronics, 223 Ramona Boulevard, West Covina, California. December 7, 1993 (submittal was misdated 1992).

5) *Preliminary Soil Investigation and Tank Closure Report.* Dri-Powr Company, Inc., 735 North Georgia Avenue, Azusa, California. April 1991.

6) *Vapor Monitoring Field Results, Third Episode.* Noram Site, 204 South Motor Avenue, Azusa, California. February 23, 1993.

7) *Installation and Sampling of Soil Gas Vapor Test Wells.* Pacific Precision Metals Facility (AKA Tubing Seal Cap), 601 South Vincent Avenue, Azusa, California, 91702. July 24, 1992.

8) *Vapor Monitoring Well Field Results, Third Episode.* RPM-Merit, 145 South Irwindale Avenue, Azusa California. January 29, 1993.

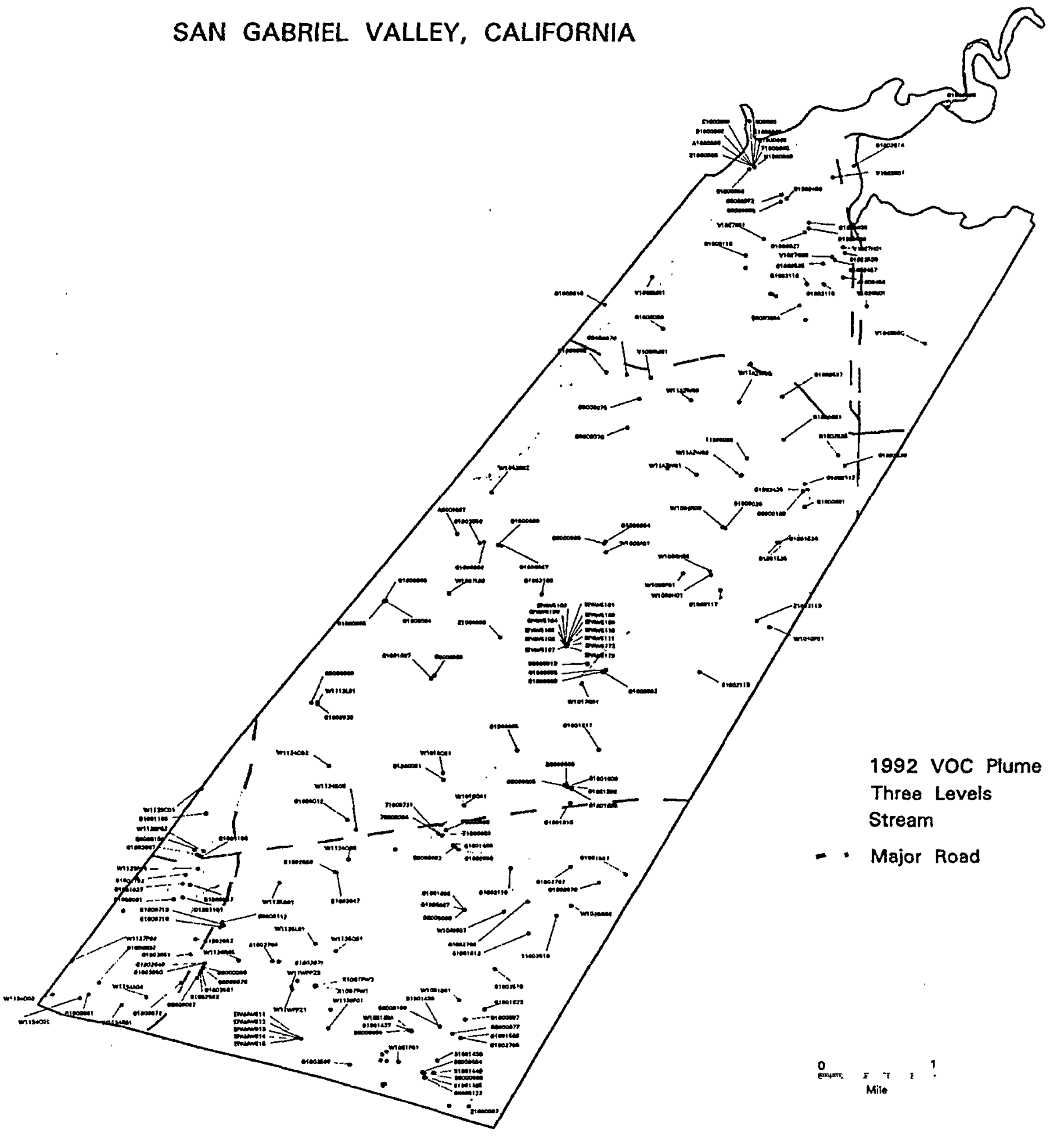
9) *Report of Supplementary Subsurface Investigation.* Rubber Urethanes, Inc., 968 West Foothill Boulevard, Azusa, California. December 23, 1992.

10) U.S. EPA's San Gabriel Basin Groundwater Quality Data Base. March 24, 1994.

11) *Preliminary August 1993 Soil Vapor Sampling Analytical Results.* Oil and Solvent Process Company, Azusa, California. (Submittal from Chemical Waste Management to U.S. EPA). September 7, 1993.

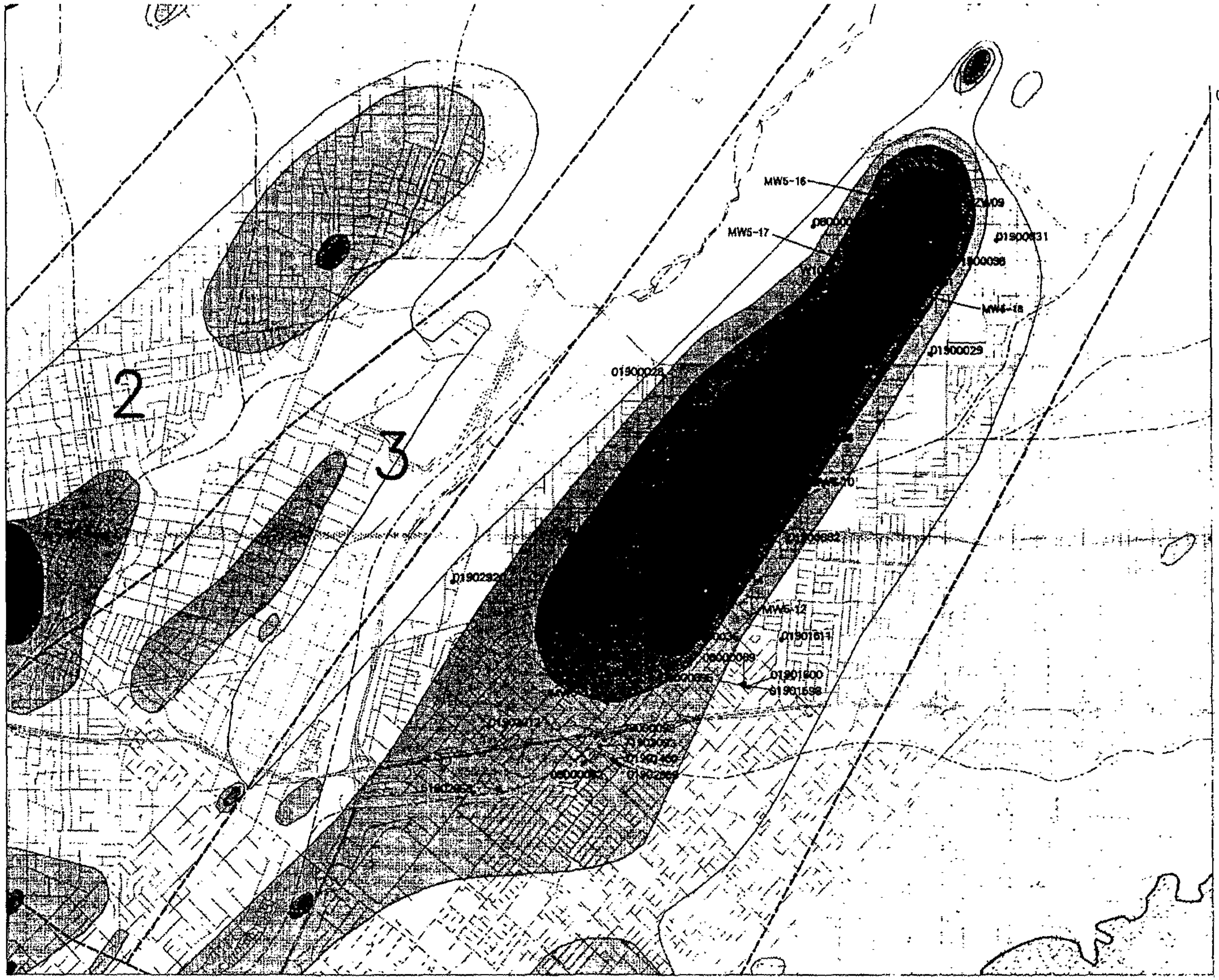
BALDWIN PARK STUDY AREA

SAN GABRIEL VALLEY, CALIFORNIA



BALDWIN PARK OPERABLE UNIT RECORD OF DECISION

Figure RS-2



0 0.5 1 2

MILES

LEGEND

BEDROCK OUTCROP

ROADS

ALLUVIAL AQUIFER

RI AREAS

STREAMS

CONTAMINATION ZONE BOUNDARY

EXISTING WELL INCLUDED IN MONITORING PROGRAM

PROPOSED NEW WELL INCLUDED IN MONITORING PROGRAM

VOC CONTAMINATION POTENTIALLY EXCEEDING 1000X MCLS

VOC CONTAMINATION POTENTIALLY RANGING FROM 100X TO < 1000X MCLS

VOC CONTAMINATION POTENTIALLY RANGING FROM 20X TO < 100X MCLS

VOC CONTAMINATION POTENTIALLY RANGING FROM 10X TO < 20X MCLS

VOC CONTAMINATION POTENTIALLY RANGING FROM MCLS TO < 10X MCLS

VOC CONTAMINATION POTENTIALLY RANGING FROM LABORATORY DETECTION LIMITS TO < MCLS

NOTE WELLS MW5-8, MW5-9 AND MW5-10 ARE NOT INCLUDED IN THE ALTERNATIVE 1 MONITORING PROGRAM.

THE AREAS OF CONTAMINATION SHOWN REPRESENT SIMPLIFIED APPROXIMATIONS BASED ON THE MAXIMUM CONCENTRATION OF ANY VOC DETECTED BETWEEN JUNE 1990 AND AUGUST 1991 OR THE LAST SAMPLE IF NONE EXISTS IN THIS TIME PERIOD. BECAUSE OF THE LONG TIME PERIOD, A WELL MAY AT TIMES PRODUCE WATER WITH DIFFERENT CONTAMINANT LEVELS THAN THOSE INDICATED. DIFFERENCES COULD ALSO BE CAUSED BY THE VERTICAL VARIABILITY IN CONTAMINATION (THE FIGURE IS A TWO-DIMENSIONAL DEPICTION OF CONTAMINATION THAT ACTUALLY VARIES WITH DEPTH).

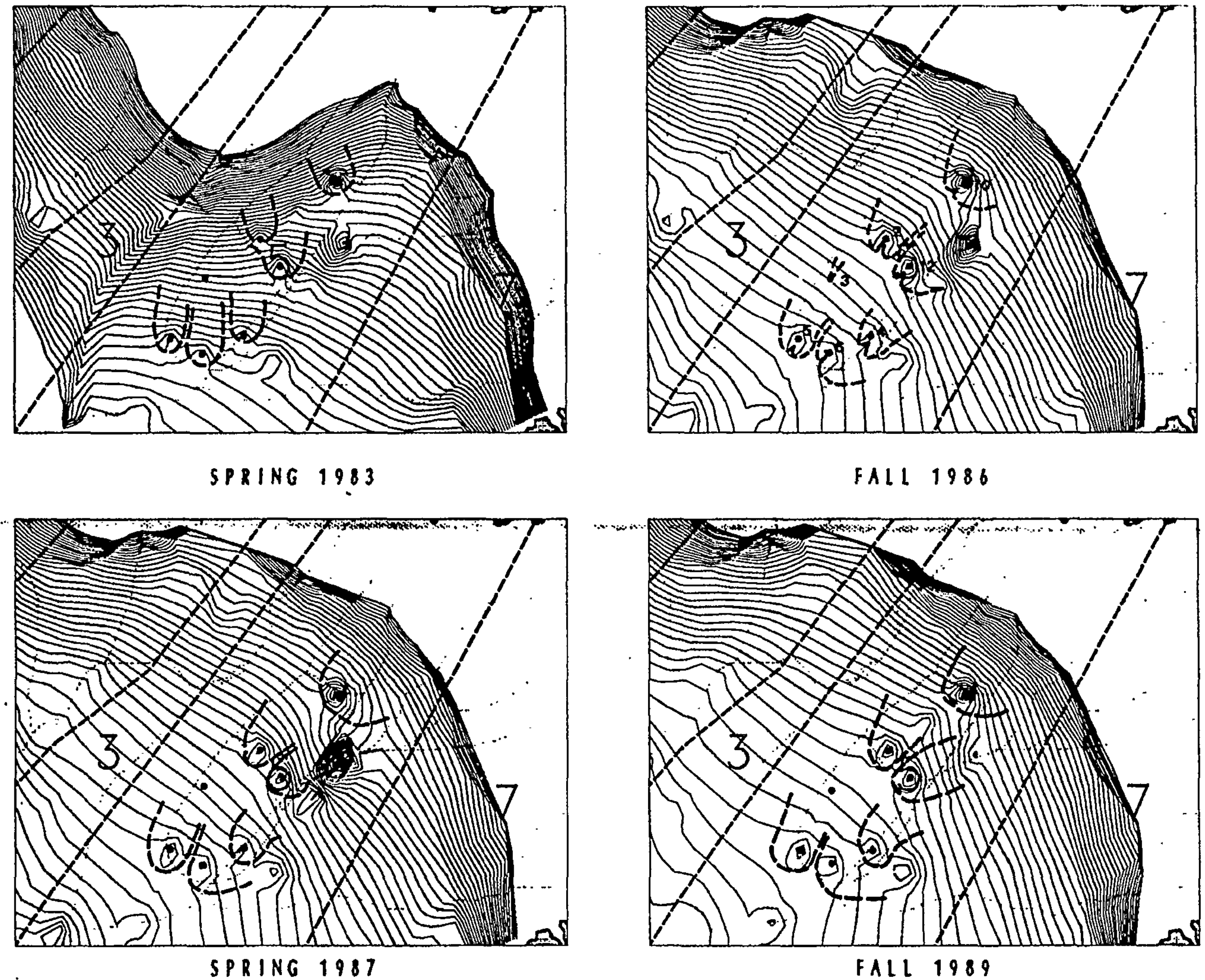
THE FIGURE SHOWS ONLY REGIONAL VARIABILITY IN CONTAMINATION. IN MUCH OF THE BASIN, DISTANCES BETWEEN DATA POINTS ARE IN THE 1,000'S OF FEET. THUS, THERE IS SIGNIFICANT UNCERTAINTY IN THE TRUE LOCATIONS OF THE CONCENTRATION CONTOURS.

FIGURE RS-3

GROUNDWATER MONITORING PROGRAM

BALDWIN PARK OPERABLE UNIT
RESPONSIVENESS SUMMARY
San Gabriel Basin

SCO68118.R6



LEGEND:

BEDROCK OUTCROP

RI AREA BOUNDARY

HYDROLOGIC BOUNDARY

ALLUVIAL AQUIFER BOUNDARY

STREAMS

SUBAREA BOUNDARY

SIMULATED CONTOURS OF GROUNDWATER ELEVATION

APPROXIMATE LIMIT OF OU EXTRACTION WELL CAPTURE ZONE

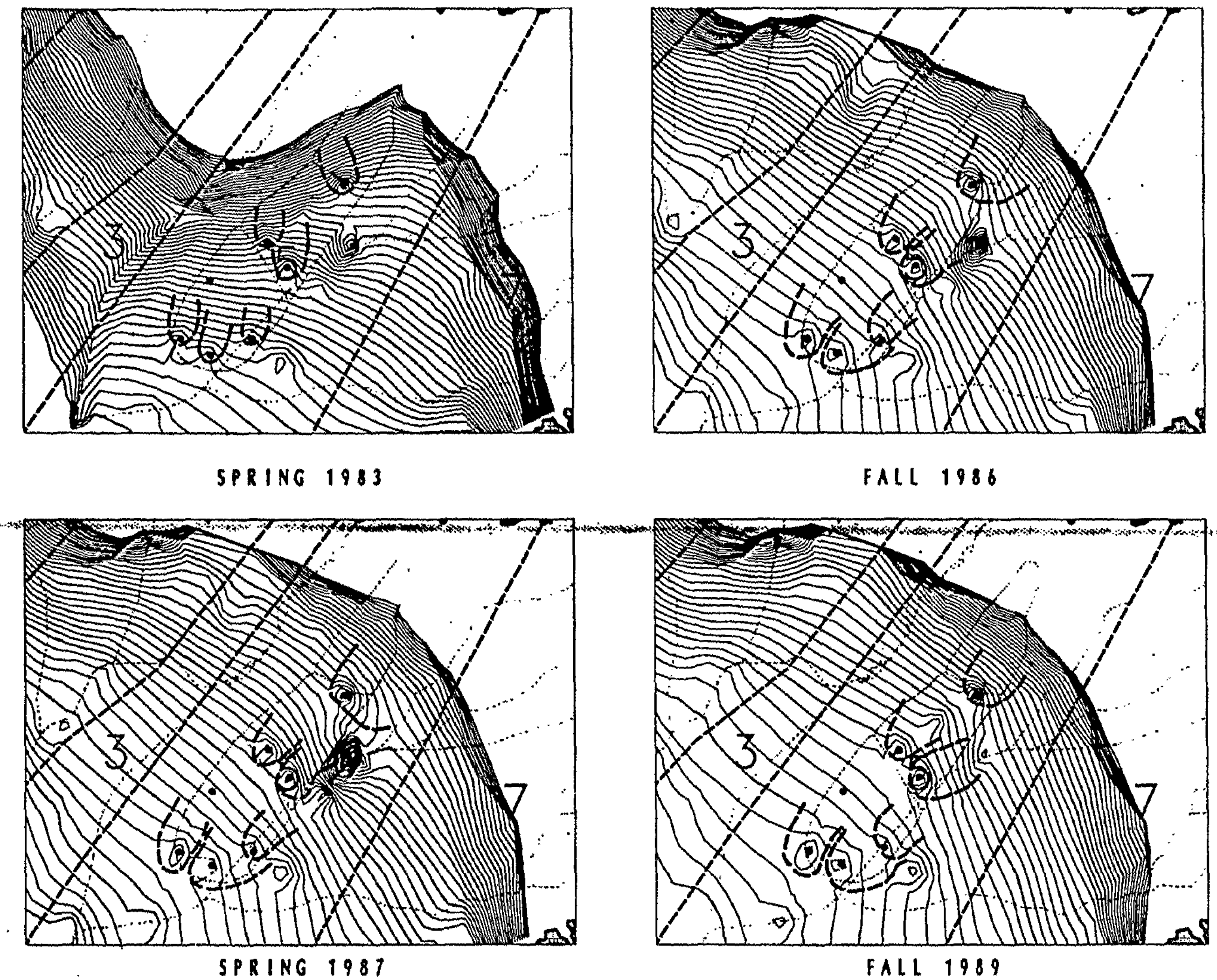
PROPOSED EXTRACTION WELLS

NOTE: SIMULATED CONTOUR INTERVAL IS ONE FOOT.

FIGURE RS-4
SIMULATED CONTOURS
OF GROUNDWATER ELEVATION
38,500 GPM SCENARIO

BALDWIN PARK OPERABLE UNIT
RESPONSIVENESS SUMMARY
San Gabriel Basin

SCO69115.R6



MILES

LEGEND:

- BEDROCK OUTCROP
- RI AREA BOUNDARY
- HYDROLOGIC BOUNDARY
- ALLUVIAL AQUIFER BOUNDARY
- STREAMS
- SUBAREA BOUNDARY
- SIMULATED CONTOURS OF GROUNDWATER ELEVATION
- APPROXIMATE LIMIT OF OU EXTRACTION WELL CAPTURE ZONE
- PROPOSED EXTRACTION WELLS

NOTE: SIMULATED CONTOUR INTERVAL IS ONE FOOT.

FIGURE RS-5
SIMULATED CONTOURS OF GROUNDWATER ELEVATION 32,500 GPM SCENARIO

BALDWIN PARK OPERABLE UNIT
RESPONSIVENESS SUMMARY
San Gabriel Basin

SCO68118.R6

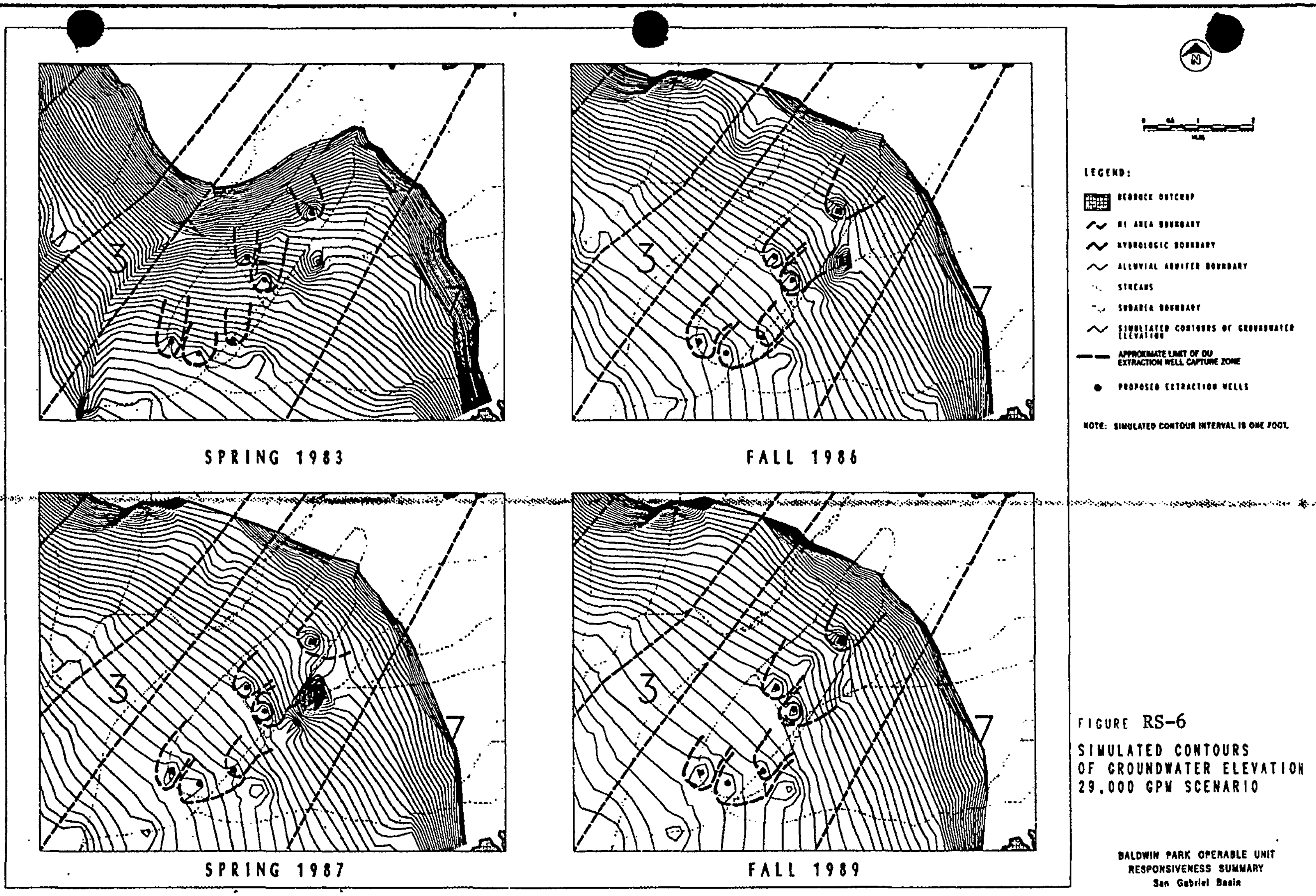
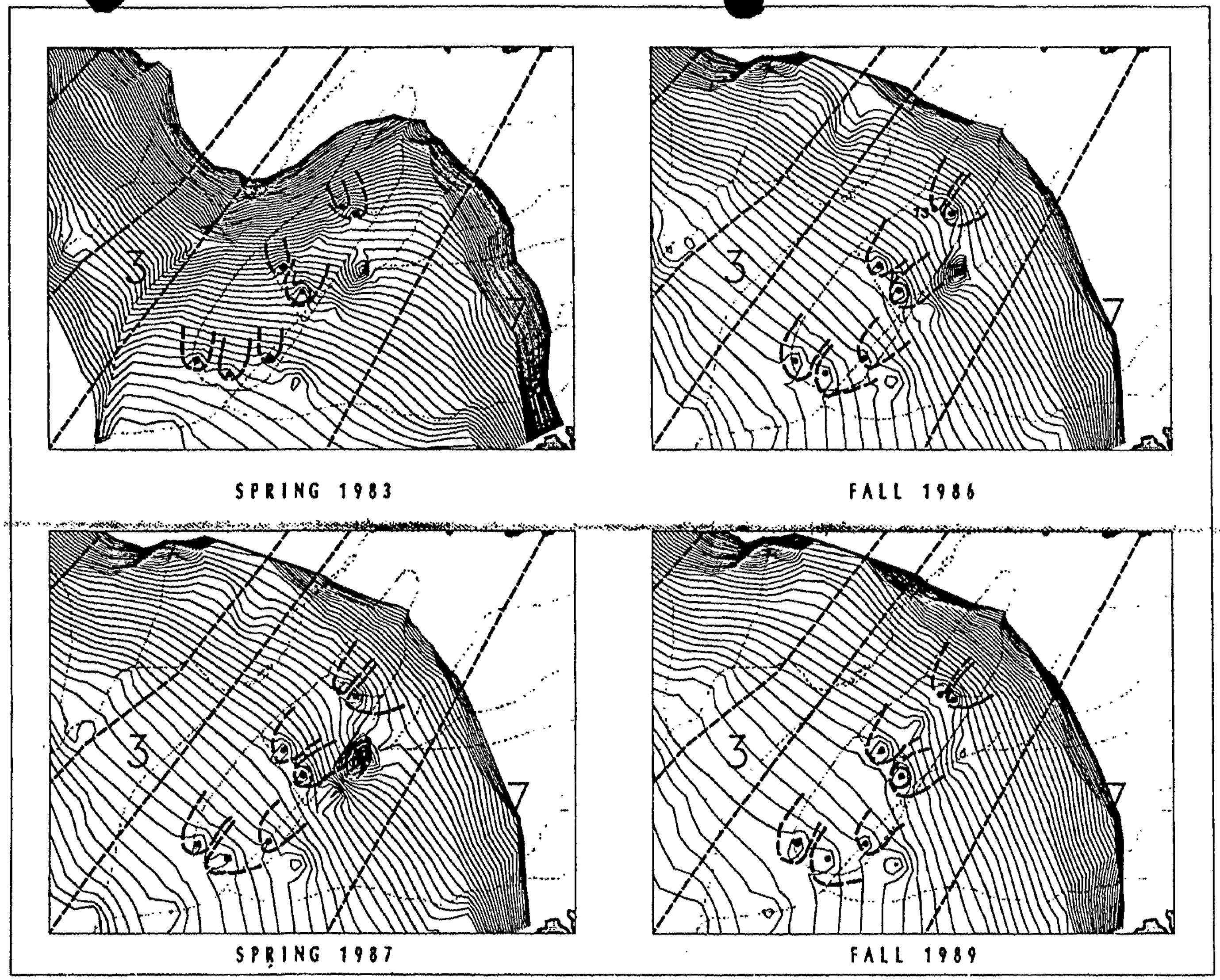


FIGURE RS-6
SIMULATED CONTOURS OF GROUNDWATER ELEVATION 29,000 GPM SCENARIO

BALDWIN PARK OPERABLE UNIT
RESPONSIVENESS SUMMARY
San Gabriel Basin

BCO69118.R6



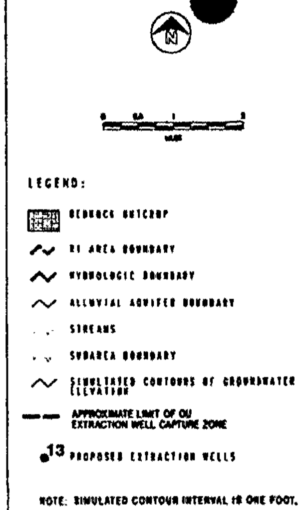


FIGURE RS-7
SIMULATED CONTOURS OF GROUNDWATER ELEVATION 29,000 GPM MODIFIED SCENARIO

BALDWIN PARK OPERABLE UNIT
RESPONSIVENESS SUMMARY
San Gabriel Basin

SCO69118.R6

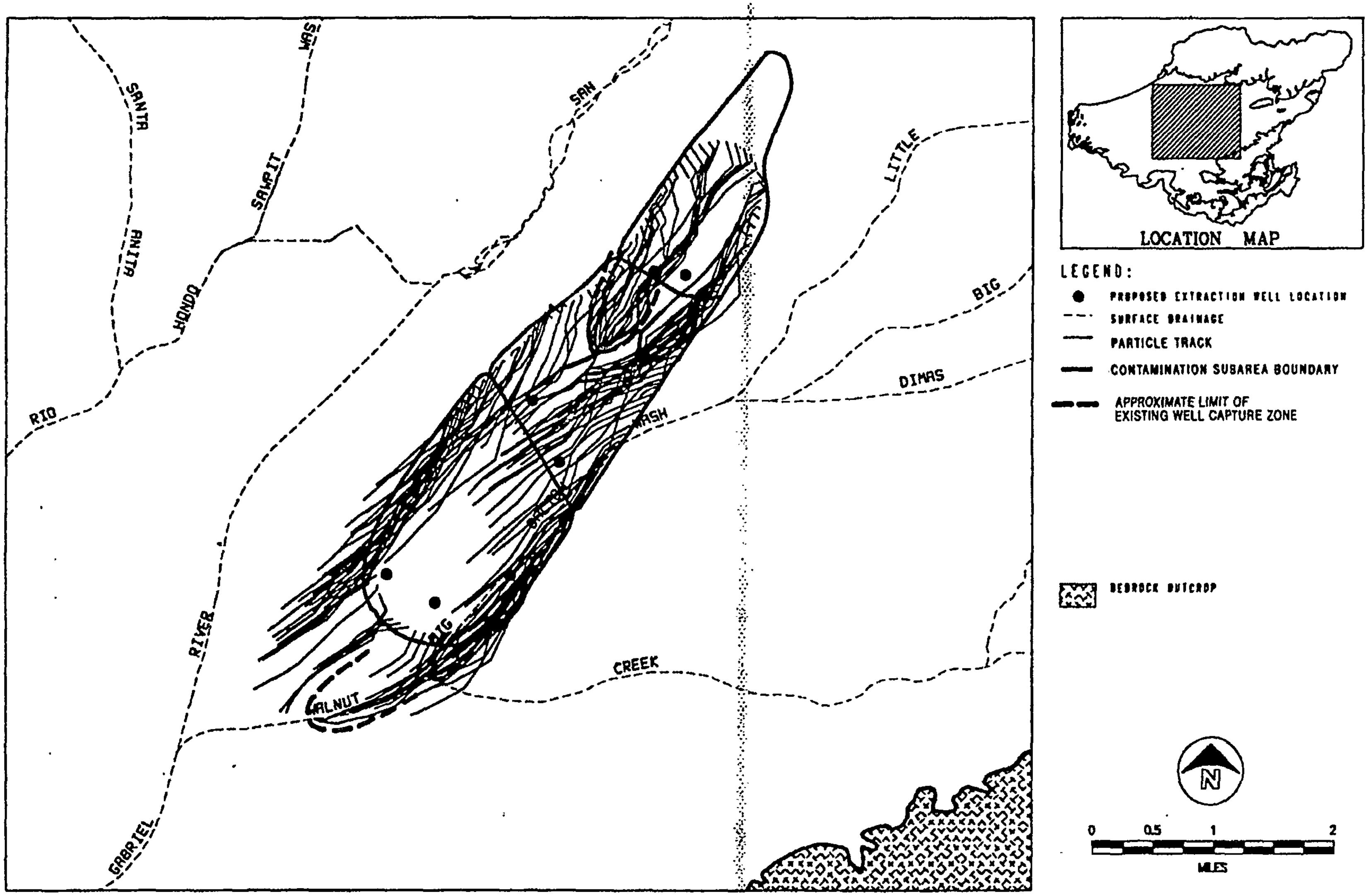
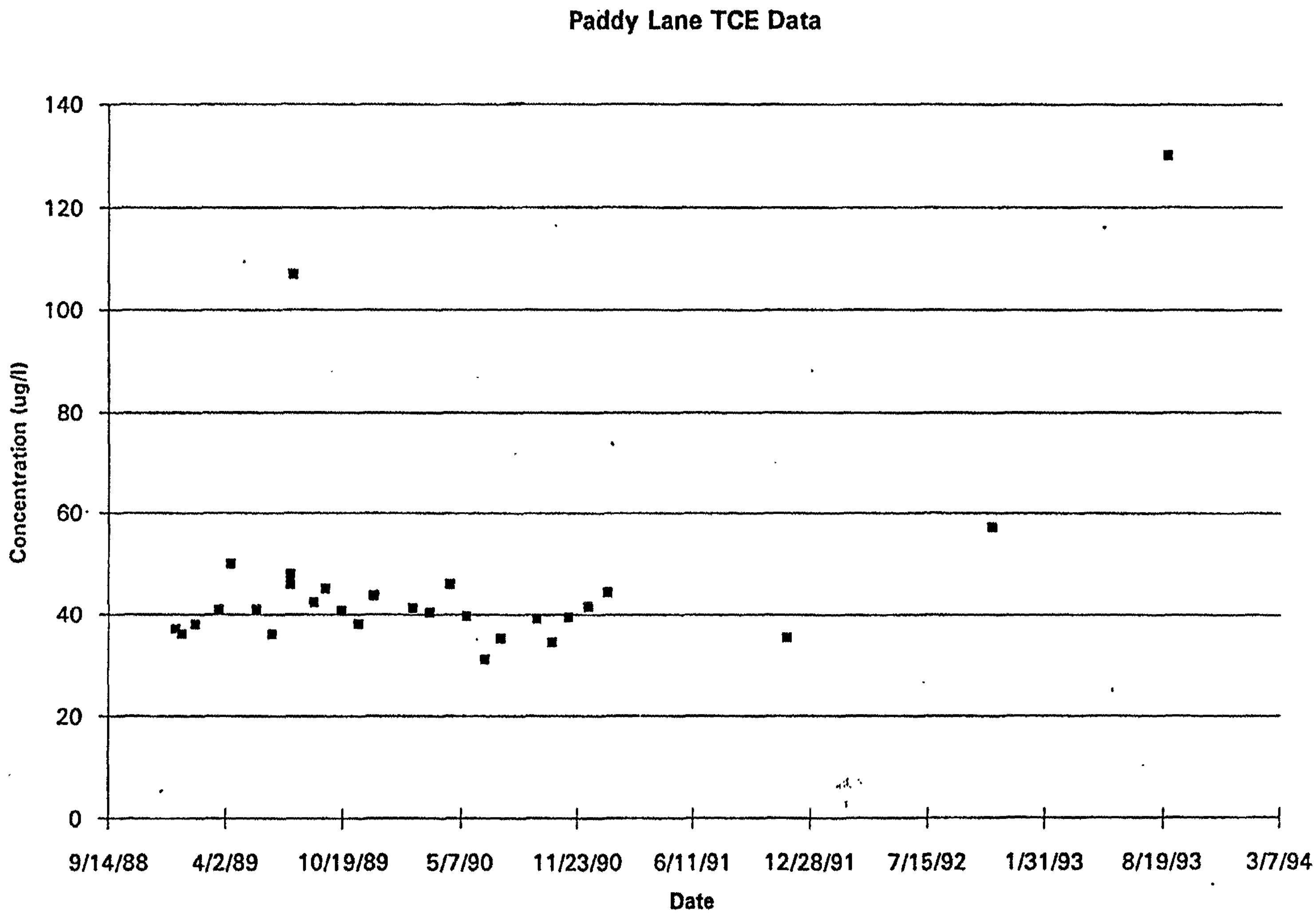
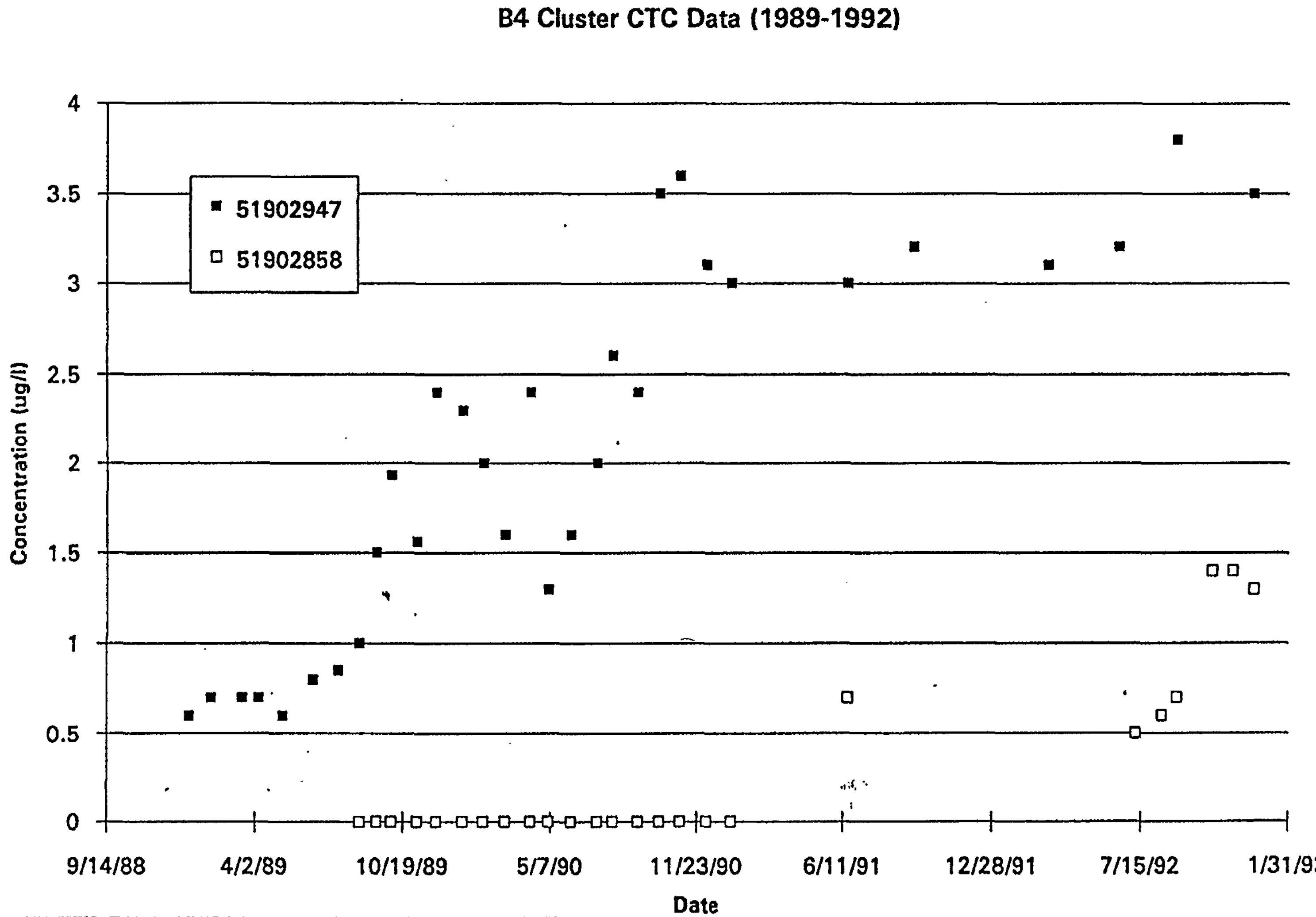


FIGURE RS-8
PARTICLE TRACKING RESULTS - BASE CASE
(NO-ACTION ALTERNATIVE)

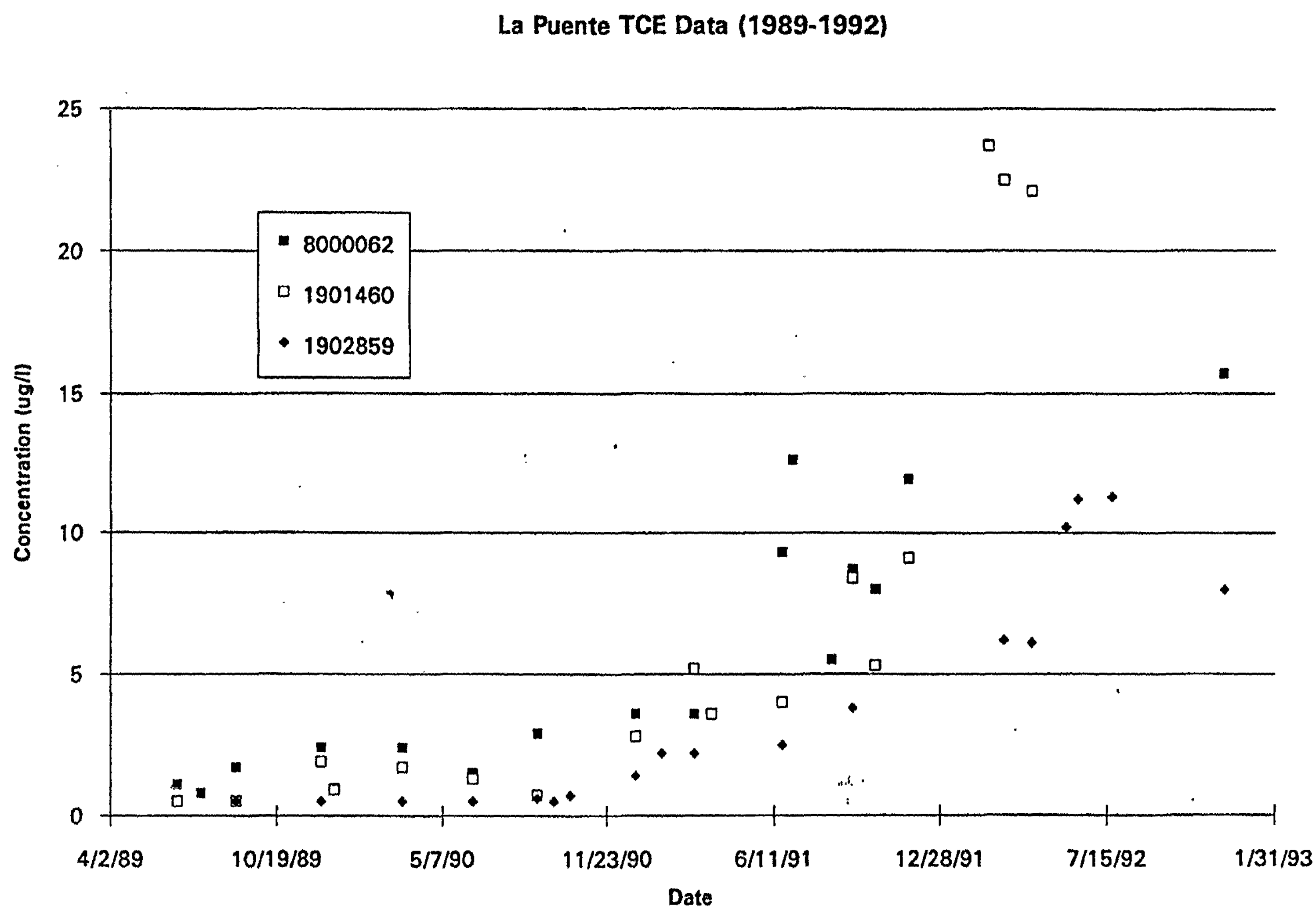
BALDWIN PARK OPERABLE UNIT
RESPONSIVENESS SUMMARY
San Gabriel Basin



BALDWIN PARK OPERABLE UNIT RESPONSIVENESS SUMMARY
Figure RS-9



BALDWIN PARK OPERABLE UNIT RESPONSIVENESS SUMMARY
Figure RS-10



BALDWIN PARK OPERABLE UNIT RESPONSIVENESS SUMMARY
Figure RS-11

Table RS- 1
BALDWIN PARK RESPONSIVENESS SUMMARY
SUBAREA 1 COST COMPARISON: AIR SPARGING VS. PUMP AND TREAT

Description/Cost Item	Estimated Cost ($1,000's)		
	Pump/Treat		Air Sparging
Construction Elements			
Well Systems	$912		$5,600
Treatment Facility	$4,415		$300
Pipelines/Pumping/Blowers	$3,465		$900
Construction Subtotal	$8,792		$6,800
Bid & Scope Contingencies	$3,077		$2,380
Construction Total	$11,869		$9,180
Services During Construction	$1,187		$918
Land Acquisition	$650		$1,100
Total Implementation Cost	$13,706		$11,198
Engineering, Legal & Admin Cost	$3,015		$2,464
TOTAL CAPITAL COST	**$16,721**		**$13,662**
Purveyor Reimbursement ($50/ac-ft)	($686)		$0
Electrical Cost - Wells	$864	Elect- Blowers	$723
Electrical Cost - Pump Stations	$380	Elect.-Vac. Pump	$270
Electrical Cost - Treatment Facility	$173		$7
Treatment Plant Operations	$1,163		$101
Maintenance	$176		$136
TOTAL ANNUAL O&M COST	**$2,070**		**$1,238**
Net Present Worth of O & M Cost			
@ 3 Percent	$40,570		$24,256
@ 5 Percent	$31,819		$19,023
@ 10 Percent	$19,512		$11,666
TOTAL NET PRESENT WORTH			
@ 3 Percent	$57,291		$40,977
@ 5 Percent	$48,540		$35,745
@ 10 Percent	$36,234		$28,387

TABLE RS-2. ESTIMATED EXCESS LIFETIME CANCER RISKS USING CAL EPA CANCER SLOPE FACTORS (in place of the slope factors assumed in the Baldwin Park Operable Unit Feasibility Study)

CONTAMINANT	CAL EPA CANCER SLOPE FACTORS		ESTIMATED EXCESS LIFETIME CANCER RISKS USING CAL EPA CANCER SLOPE FACTORS			
	ingest (oral)	inhal.	ave, ingest	ave, inhal	RME, ingest	RME, inhal
1,2-dichloroethane	(1)	(1)	6E-7	6E-7	3E-6	3E-6
benzene	0.1	0.1	2E-7	2E-7	7E-7	7E-7
carbon tetrachloride	0.15	0.15	9E-7	9E-7	5E-6	5E-6
chloroform	0.03	0.02	3E-7	1E-7	1E-6	7E-7
methylene chloride	0.014	0.0035	2E-8	7E-9	7E-8	2E-8
tetrachloroethylene	0.05	0.05	2E-6	2E-6	1E-5	1E-5
trichloroethylene	(1)	(1)	2E-6	3E-6	1E-5	2E-5
TOTAL RISK (using CAL EPA cancer slope factors)	---	-----	6E-6	7E-6	3E-5	4E-5
TOTAL RISK REPORTED IN BALDWIN PARK OUFS (4/2/93)	---	-----	6E-6	6E-6	3E-5 (2)	3E-5

NOTES: (1) Cancer slope factors listed in Table 5-7 of Baldwin Park OU Feasibility Study are assumed since comment did not disagree with cancer slope factors used for these compounds.

(2) Estimate incorrectly reported in Baldwin Park FS as 4E-5

Table RS- 3
Groundwater Monitoring Program- New Wells
(Proposed Plan Alternative)

Well No.	Total Depth (ft)	Perforated Intervals (ft)[1]							
		1st	2nd	3rd	4th	5th	6th	7th	Monitoring Well Purpose
MW5-02	1,800[2]	200-210	300-310	400-410	500-510	600-610	700-710	800-810	Monitoring for most of the aquifer downgradient of Subarea 3 to fill a data gap for remedial design and to monitor remedial effectiveness
MW5-03	1,200[3]	300-310	400-410	500-510	600-610	700-710	800-810	900-910	Monitoring across the entire aquifer downgradient of Subarea 1 to fill a data gap for remedial design and to monitor remedial effectiveness
MW5-04P (3)	250	180-240							Three piezometers located around Cluster 4 to evaluate remedial effectiveness of extraction, not needed for remedial design
MW5-05[4]	600	190-200	390-400	580-590					Monitoring at Cluster 5 to provide contaminant data for remedial design prior to installation of the extraction well
MW-05P (3)	250	180-240							Three piezometers located around Cluster 5 to evaluate remedial effectiveness of extraction, not needed for remedial design
MW5-06P (3)	250	180-240							Three piezometers located around Cluster 6 to evaluate remedial effectiveness of extraction, not need for remedial design
MW5-07	600	190-200	390-400	580-590					Fill data gap for remedial design and provide upgradient early warning monitoring for Cluster 5 during implementation
MW5-11[4]	700	290-300	490-500	680-690					Monitoring at Cluster 13 to provide contaminant data for remedial design prior to installation of the extraction well
MW5-12	650	250-260	450-460	630-640					Upgradient early warning monitoring for Cluster 4 during implementation, not needed for remedial design
MW5-13	700	340-350	510-520	680-690					Fill data gap for remedial design and provide upgradient early warning monitoring for Clusters 10 and 13 during implementation
MW5-14	650	250-260	450-460	630-640					Fill data gap for remedial design and provide upgradient early warning monitoring for Cluster 4 during implementation
MW5-15	700	190-200	450-460	680-690					Fill data gap for remedial design and provide upgradient early warning monitoring for Cluster 6 during implementation
MW5-16	600	340-350	460-470	590-600					Provide additonal data on vertical distribution of contamination at location of known shallow contamination

Table RS-3
Groundwater Monitoring Program- New Wells
(Proposed Plan Alternative)

Well No.	Total Depth (ft)	Perforated Intervals (ft)[1]							
		1st	2nd	3rd	4th	5th	6th	7th	Monitoring Well Purpose
MW5-17	700	500-510	680-690						Provide additional data on the lateral and vertical extent of contamination away from facilities in Subarea 1
MW5-18[4]	600	450-460	580-590						Monitoring at Cluster 10 to provide deeper contaminant data for remedial design prior to installation of the extraction wells

[1]Subject to revision/change.
[2]MP monitoring well- other perforated intervals = 1,000-1,010; 1,200-1,210; 1,400-1,410; 1,600-1,610; 1,780-1790
[3]MP monitoring well- other perforated intervals = 1,000-1,010; 1,100-1,110; 1,180-1,190
[4]To be located at corresponding extraction well cluster site.